BULLETIN of the
SCHOOL OF EDUCATION
INDIANA UNIVERSITY

Indiana and Midwest School Building Planning Conference: Proceedings

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BULLETIN OF THE SCHOOL OF EDUCATION
INDIANA UNIVERSITY

Indiana and Midwest School Building Planning Conference: Proceedings

Planning School Buildings for the Whole Child

Published by the
DIVISION OF RESEARCH AND FIELD SERVICES
Indiana University

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FOREWORD

It is with great pleasure that we present the proceedings of the 1954 Indiana and Midwest School Building Planning Conference. These proceedings take up two issues of our School of Education *Bulletin* because the conference logically breaks up into two major divisions: first, the problem concerning reorganization of school districts and, second, the problems concerning the psychological environment of the building including the appraisal of two types of "low-cost" buildings.

This is the eighth in this series of conference bulletins. A perusal of these eight bulletins will reveal a wealth of good practical information concerning schoolhouse construction. We recommend them for frequent reference.

Again we suggest that you keep July 7 and 8, 1955, open to attend the 1955 Indiana and Midwest School Building Planning Conference.

PAUL W. SEAGERS
Chairman

Program

1954

INDIANA AND MIDWEST SCHOOL BUILDING PLANNING CONFERENCE

THEME: *"Planning School Buildings for the Whole Child"*

July 8 sessions will be held jointly with the Indiana Workshop in State and Local Government
Chairman, Louis E. Lambert

PAUL W. SEAGERS, *Conference Chairman*
WENDELL W. WRIGHT, *Dean, School of Education*

SCHOOL OF EDUCATION INDIANA UNIVERSITY
BLOOMINGTON, INDIANA

THURSDAY AND FRIDAY
JULY 8-9, 1954

THURSDAY MORNING, JULY 8

School of Education—University School

9:00 a.m.*

Registration—Lobby, University School

10:00 a.m.

Auditorium, University School

Chairman, Dr. H. L. Smith

Welcome: H. B. Allman

WHY WE NEED LARGE SITES

Dr. H. L. Smith

PLACE OF THE STATE UNIVERSITY IN COOPERATIVE STUDIES

Assistant Dean Maurice E. Stapley

REORGANIZATION PROGRESS IN INDIANA

Wilbur Young

THURSDAY AFTERNOON, JULY 8

1:30 p.m.

Auditorium—University School

REORGANIZATION OF BASIC SCHOOL UNITS

Chairman, Louis E. Lambert

PRINCIPLES FOR REORGANIZATION

Forrest W. Murphy

COMMUNITY CONCEPT OF SCHOOL REORGANIZATION

W. Monfort Barr

Discussion: Paul R. Griesel
Richard H. Martin

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* Daylight Saving Time

THURSDAY EVENING, JULY 8

8:00 p.m.

Auditorium—University School

Chairman, Edward D. James

THEORY OF SCHOOL DESIGN

Richard J. Neutra

Discussion, Educational Implications of Survival Through Design

Darell B. Harmon

FRIDAY MORNING, JULY 9

9:00 a.m.

Auditorium—University School

Chairman, Ralph H. Banks

VISUAL APPRAISAL OF DESIGN FACTORS

C. A. Winkelhake

DESIGN FOR THE HUMAN BEING

Paul W. Seagers

Discussion period by conference

FRIDAY AFTERNOON, JULY 9

1:30 p.m.

Auditorium—University School

Chairman, H. E. Binford

LOW COST SCHOOL BUILDINGS

Maximlite Buildings

T. Ewing Shelton

Armco Buildings

L. S. Shealy, Jr.

Discussion: Ralph Legeman
Everett I. Brown
Harold Maurer

WHO'S WHO AMONG THE SPEAKERS

Allman, Heyman B., Director of Summer Sessions, and Professor of Education, Indiana University.

Banks, Ralph H., Superintendent of Schools, Vincennes, Indiana.

Barr, W. Monfort, Consultant on School Finance and Reorganization, and Associate Professor of Education, Indiana University.

Binford, Hamilton E., Superintendent of Schools, Bloomington, Indiana.

Brown, Everett I., Architect, Indianapolis, Indiana.

Fanning, Ralph, Engineer, Celina, Ohio.

Griesel, Paul R., Statistical Officer, State Department of Public Instruction, Indianapolis, Indiana.

Harmon, Darell B., Consulting Educationist, Austin, Texas.

James, Edward D., Architect, Indianapolis, Indiana.

Lambert, Louis E., Chairman of the Indiana Workshop in State and Local Government, and Assistant Professor of Government, Indiana University.

Legeman, Ralph, Architect, Evansville, Indiana.

Martin, Richard H., Publisher, Fortville, Indiana.

Matthews, James W., Architect, Springfield, Missouri.

Maurer, Harold, Architect, South Bend, Indiana.

Murphy, Forrest W., Dean of the School of Education, University of Mississippi.

Neutra, Richard J., Architect, Consultant, and Author of *Survival Through Design*, Los Angeles, California.

Seagers, Paul W., School Building Consultant, and Professor of Education, Indiana University.

Shealy, L. S., Jr., Armco Drainage and Metal Products, Middletown, Ohio.

Smith, Henry Lester, Dean Emeritus of the School of Education, Indiana University, and Director of Schoolhouse Planning, Indiana State Department of Public Instruction, Indianapolis, Indiana.

Stapley, Maurice E., Assistant Dean of the School of Education, and Professor of Education, Indiana University.

Winkelhake, C. A., Architect and Educational Consultant, Austin, Texas.

Young, Wilbur, State Superintendent of Public Instruction, Indianapolis, Indiana.

WHY WE NEED LARGE SITES

Henry Lester Smith

In the early years of public school education in the United States of America, the essence of a school plant was the building which housed the pupils and the ground upon which the building was situated. Education was conceived of as taking place wholly within the walls of the building, and not on the school site outside of the building. Even at that time this was an erroneous concept, because pupils were being educated (mostly in the wrong direction) on the school grounds where they loitered during the rest period or encroached on neighboring areas in their play activities, to the distraction of the owners of these areas. Community irritation was the result of this latter action, and defensive techniques used by the children in resisting accusations and consequent discipline developed traits inimical to the development of acceptable character and good citizenship. When accused of damaging fences or crops when trespassing, they often yielded to the temptation of misinterpreting the facts and of inexcusable anger and resentment against those who complained against their acts. Moreover, the friction ensuing led to administrative problems of discipline and a consequent lack of harmony between teacher and pupil. In my own personal experience I witnessed such a situation develop to the point where an overgrown boy at recess time drew a knife and dared the teacher to come outside the schoolhouse door.

Gradually, consciousness of the necessity for some outside space for recreation of pupils during recess periods began to awaken, and the need for a limited space other than that essential for the building itself was slowly recognized. Even today, however, the general public, and often the school boards and the members of the teaching staff and administrative officials, limit their idea of school ground areas to space needed for buildings and recreation.

During the years intervening between pioneer days and the present, evolving and growing concepts of the responsibilities of a system of public school education have emerged. Among these, two have had major influence in enlarging the concept that increased school plant acreage is essential. I refer to the fact that recognition was given to the possibility, probability, and desirability of supplementing indoor instruction with outdoor instruction on the school grounds, where usable facilities could be provided.

The second major influence in expanding the acreage of the school grounds has been the growing recognition that the school plant should be fashioned to many community uses which dovetailed into the general program for the education of the youth of the community. Among other factors effecting increases in the school ground acreage have been changes in the philosophy of education, school organization, administration of education, methods of teaching, expanding curriculum, recording systems, and general support of education. Each of these can easily be shown to influence building expansion or outdoor space for other educational purposes. In many instances a change in one of these factors influences not only the need for increased building space but also the need for increased acreage for purposes other than buildings.

It took years and even decades for the buds of these various emergency needs to appear, but within the past decade these buds have been bursting and in many instances have been progressing toward full bloom.

So great has been the pressure of these emergency needs for recognition and adequate provision that only a few years ago the three national education associations related most closely to school plant needs almost simultaneously stated, through publications, their ideas about what the minimum space requirement should be in order that a reasonably adequate educational program might be provided. I refer to publications of the National Council on Schoolhouse Construction, the American Association of School Administrators, and the National Council of Chief State School Officers. These publications have had marked influence in bringing to the attention of school officials and laymen the need for rethinking expansion programs and the consequent need for physical provisions for such expansion. With renewed stimulus from these bulletins and from current practices in other states, Indiana made strides in meeting the new needs. The result has been the publication of rules and regulations relating to procedure, planning, and approval in remodeling old or constructing new school plants. In these rules and regulations, Item III-A relates to standards governing site size. The General Commission of the State Board of Education moved slowly in this direction and adopted practically the minimum set by the three national education associations previously referred to, leaving for future consideration the recommendation of these three organizations that school plant areas should be at least double the minimum advocated.

In the administration of these adopted rules and regulations, efforts have been made to become more cognizant of the growing needs, to lead school officials and laymen to a better understanding and acceptance of them, and to deepen our own understanding of the significance of the new standards for our state. On every side there is evidence of an easing of resistance against the standards and of an understanding and acceptance of the newer philosophy. There have been many recent cases where local school corporations have on their own initiative gone beyond the legal requirement and procured as much as 30, 40, or even 50 acres for elementary schools. Moreover, they have given evidence of having conceived an educational program that would profitably utilize this amount of space, and of developing plans for putting into effect an enlarged and varied educational program.

From a psychological point of view, also, the extended area is of advantage. Freedom from crowded living quarters in thickly populated areas and from the hazardous traffic through our city streets is joyously felt when wide-open spaces are available. Adequate acreage in the school grounds furnishes conditions for such feelings of relief. Moreover, when one is not having to jump for safety or yearn for space for free and easy movement, opportunity for contemplation is afforded. Periods of semi-isolation from distraction or hazards furnish opportunity for reflection and for an integrating mental activity. Through such opportunities the discovery of relationship is more probable and the process of organizing experiences and knowledge is enhanced.

A change in educational philosophy and in our whole outlook on life influenced our regard for more school ground space. Other factors were need for larger classrooms; more kinds of teaching activity; newer methods of instruction; cooperation with the community; keeping nuisances from developing too close to the school building, such as manufacturing plants, noises, odors, hazards, loafing places; increased numbers of children attending; changing types of school administration; the urge for freedom from crowded conditions; and the need for entertainment not only for its own sake but also as a substitute for something harmful. The standard of living in the community also affects the size of the school site. Likewise, the local concept of economy which calls for consolidation in order to enlarge the taxing base and for increased production and consumption enters the picture as a factor. Another problem that is involved here is the relation of elements in the population. Are there to be many personal contacts or is isolation to be devel-

oped? Present-day crowded conditions call for training in living together harmoniously in masses. Group games on the playground can contribute significantly to the solution of this problem.

Recreation is a readily recognizable need for ample activity space. The layman feels this need but he has little idea of the extent of acreage needed. The recreation area should be set back from the street traffic or school bus traffic to prevent conflict, and the different play spaces should be separated by safety zones to prevent accident. Spaces for those watching the games should be provided. If the idea of community center is accepted in the community, areas similar to those mentioned should be provided for the adults in the community. Areas for future expansion of recreational facilities should also be provided. Playground space is needed for such activities as football, baseball, badminton, basketball, golf, handball, hockey, tennis, volleyball, speedball, softball, horseshoes, croquet, archery, ice skating, sledding, skiing, etc.

For a large high school, of perhaps 2,000 pupils, recreational space alone calls for about a half million square feet. Space necessary for each high school pupil varies greatly. For simple games, the space should be about 18 square feet per player. This requirement would mount to 6,000 square feet for baseball. The half million square feet would accommodate about 500 pupils at a single recreation period.

Outside educational areas should include space for shop activity and student construction projects; a woods for nature study; areas for amphitheater and for pageantry of various types; outdoor classroom space for science, agriculture, geography, and arithmetic taught by practical measurement; space for experiments by Future Farmers of America; picnic grounds for adults; space for scoutcraft; youth hostels; hiking trails; and an area for automobile driver training.

For service purposes, parking spaces are needed, as well as areas for sidewalks, driveways, loading and unloading areas, landscaping, and court areas between portions of the building proper. Many illustrations of outdoor provisions for educational practices, community use, and general recreation might be given.

For instance, in one community where I visited schools I found geographical maps built into outside concrete floors showing mountains, rivers, lakes, and prairie areas. In another community, lower grade arithmetic was being taught in connection with the laying off of a small garden spot, with the portion indicated that was to be allocated to each of the pupils. In many communities provision is made for wooded picnic grounds. In some communities training

is given pupils in setting out and caring for shrubbery, grasses, and flowers that would be suggestive of ways in which they could improve their own home lawns. In one school in central Indiana, several acres on the school grounds were planted in garden truck, the pupils being taught how to prepare the soil for planting, how to plant and care for everything during the growing season, and how to harvest and can the crop. During the school year, this product was used in connection with the school lunches.

In a southern community a creosoting plant was constructed on the school grounds and instruction in creosoting fence posts was given to both adults and school children. This provision was made in a community where stock roamed over unfenced territory until a law was passed compelling farmers to fence their stock in. The farmers had had little experience in this problem, so the school lent its aid in solving an urgent community problem.

In some communities where it is difficult for teachers to find satisfactory lodging facilities, teacherages, or cottages for housing teachers, are provided on the school grounds. Similar provisions are sometimes made for those who render custodial service.

It is a somewhat common practice to build school bus garages on the school grounds. Sometimes, too, a bus repair shop is provided. Bicycle and motor race tracks are being provided on school grounds in some places.

In more recent times, many schools have introduced driver training courses for automobile drivers. In some instances, driving practice fields are provided on the school grounds. It is conceivable that such provisions might ultimately be extended to airplane operation.

Outdoor education under the auspices of organizations other than the schools is beginning to make demands upon the schools. Provisions are being made in some school systems for camping facilities for Boy Scouts, Girl Scouts, and school camping purposes. Hostels, a provision recently introduced into the United States from Europe, were originally provided on grounds especially purchased for that purpose. In some regions, the idea is growing that the proper place for these hostels is the public school grounds, where the visiting pupils may gain a more intimate acquaintance with student life in various regions of the United States.

There is a tendency also to provide museum space in connection with the public schools. This idea was borrowed by us from Europe and has been developed somewhat in South America also. Elaborate museums have been developed in Germany where modern machinery

is exhibited. The Future Farmers of America are being accommodated on some school grounds. Provision for caring for pets, or even for an embryo zoo, has been made by some schools.

Space for storing operating machinery is becoming a necessity in some communities. Provision for future extension of the school building calls for extra space, as does the present tendency to build one-story buildings rather than multistory structures. Landscaping as practiced in modern times occupies an increasingly larger space. Adequate bomb shelters may make additional demands upon future schoolhouse development.

In many rural communities the practice is growing of using school grounds for agricultural experiment purposes, especially when pupils are being trained in such processes as well as in regular farming practices. Teachers of agriculture and agricultural county agents often co-operate in such projects.

Extra school acreage for providing community services is frequently called for. Food storage spaces, butchering provisions, and canning factories are among the more frequent of these larger community enterprises.

Space should be allowed for setting the building back from the street 100 feet or more. Around the building there should be space to accommodate pupils who are not at play, as well as space for planting to beautify the building.

Drives and walks need to be provided for in order to make the building accessible for pedestrians and vehicles. Space should be provided, also, for the proper separation of these walks and driveway spaces.

New demands are constantly being made on the space requirements. The educational program and community demands are growing, thus expanding the need for space. So space should be provided for future development in new buildings, outdoor educational programs, expanding community uses, and expanding population.

In the expansion of the school grounds, it is difficult to go beyond local vision and felt needs. However, it is a fundamental principle that room should be provided for unforeseen possibilities of the future, so that there will not be as great danger as in the past of strangulation in building design. Costs connected with obtaining additional land are always to be measured against the advantages accruing when the additional space is obtained. Investment in space should be thought of as an insurance against higher costs or even against blockades in the future.

Finally, I wish to say that the proposal in this presentation is not to outline a complete program of uses for larger school sites, but to stimulate thinking, to create an alertness to the problem, and to the present and future possibilities in connection with its solution. It is my hope, too, that some of our teacher-training institutions will see fit to give an occasional course emphasizing the needs for and the uses to be made of school grounds. Future teachers and school administrators, as well as many now in the service, need to be alerted to this problem, to the needs that exist, to ways of using school ground space to the best advantage, and to ways of enlightening the public to the changed conditions that have ushered in the call for expanded school ground spaces.

PLACE OF THE STATE UNIVERSITY IN COOPERATIVE STUDIES

Maurice E. Stapley

If an intelligent decision concerning the role of the state university in local planning is to be reached, there are three questions which must be answered. First, what are the proper functions of a university? Second, what are the limitations under which universities operate? And third, what is the nature of the assistance which is vitally needed by local communities? The answers to these questions inevitably lead to the same general conclusion.

What is the primary function of a university? It is, I think, to provide educational opportunity for its students. In doing so, it stimulates and guides students and makes information available. To do its job well, it must keep abreast of new developments, contribute as it can to knowledge itself, and discover new and better techniques for doing things. Once the university dealt only with on-campus students engaged in pre-service training. That was the era in which the university could easily get out of touch with the rest of the world and the era in which the ivory-tower concept developed. For years, however, universities have also been concerned with in-service education of students, both on-campus and off-campus. Now it recognizes an even larger student body and believes that it should help all citizens within its area of influence who wish to increase their knowledge or improve their skill. It does not properly take responsibility for dictating the life patterns, individually or collectively, of on-campus students or its citizen public. It is, as it always has been, an agency for helping students to develop their capabilities. Its purpose in relation to local planning should therefore be to supply information, to suggest procedures, and to give advice. Its purpose should not be to prepare answers to community problems, to prescribe plans for communities to adopt, or to carry on clerical types of service for the convenience of local communities.

A university, like the public school, is limited in personnel and in operating funds. Indiana University, for example, has only one school building expert. If he is to continue to be an expert in his area of specialization, he must spend much of his time keeping up with new developments. His next responsibility is to classes of prospective administrators. His remaining time and energy should be

utilized in a fashion that will do the most good for the greatest number of communities that need his help. He therefore should serve as a consultant to local groups, studying their problems and planning to meet their needs, but he should not and can not tie himself up in the task of doing building surveys for local communities. There are several hundred Indiana communities that need his help, and there can be little justification for concentrating his attention on only a few for long periods of time.

Even if universities were organized to make surveys for communities and had the facilities for doing so, such a procedure does not fit into the democratic scheme of locally controlled, directed, and supported public schools. We are experiencing a reawakening to the need for broad community participation in the study and solution of problems. This is not merely a desirable method—it is essential to increased support for public education. We do not want communities which know nothing of educational problems and prefer to be directed by the State Department in Indianapolis, the U.S. Office in Washington, or the University in Bloomington. We need local communities in which citizens ask and answer the questions: What kind of educational program do we want? What is the best way to get that educational program? Such communities will utilize a university for the advice, counsel, and critical evaluation it can give.

We could well inquire, then, concerning the ways in which universities can best help local communities in planning school building programs, reorganizing districts, or improving educational programs:

1. The university should make available to local leaders such publications as *The Local School Facilities Survey,* a bulletin of our School of Education. In this bulletin there are explanations of the various types of local surveys, information concerning procedures, sample forms for use, etc. Another publication of the School of Education that is illustrative of this type of help for school communities is a recent bulletin prepared by Dr. Barr, which gives comparative school costs for selected Indiana cities.

2. A second aid to local groups is a service that is seldom used in spite of the fact that it is free. Those engaged in local planning may come to the University for advice and counsel concerning their procedures, special problems they have encountered, or aid in interpreting data. To say that this procedure is seldom used is to speak relatively.

3. Members of the staff are available for consultant service. They will go to a community for a small fee which covers their service and their expenses. This also is a desirable method of securing expert help which, combined with local effort, is likely to produce the most desirable results.

4. The University also has survey service which it sells to local communities. Theoretically this survey service is a part of a cooperative venture, but there is grave danger that the University will do too much and the local community too little of the essential planning. It is also true that this type of service unjustifiably usurps the time of staff which is needed in many other communities.

5. A university should also carry on research studies that will be of general value to its area of influence: school sites, school reorganization, etc.

6. The University also conducts conferences, such as this one beginning today, designed to bring to the attention of school administrators and lay leaders important developments in school building construction. It conducts an administrative conference annually, workshops, P.T.A. conferences, and others.

7. Finally, it gives direction and advice indirectly by stimulating the activity of agencies and organizations.

If there is one note to stress, it is, in my opinion, the necessity for securing active participation of as many citizens as possible in the study of local needs. When this is done, the University's role will become clear, and the help it will give will be most effective.

REORGANIZATION PROGRESS IN INDIANA

Wilbur Young

One of the major educational problems in Indiana is the reorganization of school districts. There have not been many basic changes in school organization in Indiana in the last one hundred years, although educational conditions today are in many ways different from those existing a hundred years ago. After a century of educational progress in Indiana we still have a "horse and buggy" school organization plan.

In this report, school reorganization progress will be viewed from the perspective of the past, the present, and the future, in order to give an over-all picture of the development.

Public education was legalized in Indiana in 1816, the first organizational unit being the school district. This unit was established under Indiana's first constitution in 1816 and was in effect until 1852, when the General Assembly merged school districts into township corporations. At the same time, legislation also permitted cities and towns to operate their own schools. The municipal and the township corporations have continued as basic units for school operation to this day.

The next phase of school reorganization was the joint school unit. The first joint school law was passed in 1873. Between then and 1927 approximately 30 joint school laws were passed by the General Assembly. A number of them are still on the statute books.

The joint school law provided for the operation of schools by two or more corporations, but corporations participating in the agreement maintained their own identities. By the turn of the century, a substantial number of joint school units were operating in the state.

One of the difficulties with some of the joint school laws was that only a restricted group of corporations could operate a joint school under the law. For instance, in some cases the law was designated for certain class cities, which automatically eliminated many potential joint school units. Joint school laws might have been more utilized if they had been less restrictive and more widely applicable.

The next phase of school reorganization was the consolidated school unit. The first consolidated school law was passed in 1929.

Since that time eight additional laws have been passed. However, 75 per cent of all consolidations have been made under only two statutes—the 1947 law and the revision of that law in 1949.

In a consolidated reorganization two or more township, town, or city school corporations merge into a single corporation. Under consolidation laws member units do not maintain their identity as they do under joint school laws. Two notable examples of consolidation were the merging of all of the township units in Brown County and in Floyd County into single consolidated units. Another noteworthy example is the consolidation of the city of Bloomington and two surrounding townships. This was the most populous consolidated unit in the state until the recent consolidation at Kokomo.

In spite of tremendous gains in the postwar years, the over-all impact of reorganization on education in Indiana has been slight. In 1952-1953 there were 41 joint school units and 60 consolidated school units operating in Indiana. They had a total enrollment of less than 100,000 pupils. This was only slightly more than 10 per cent of the total public school enrollment in Indiana.

The trend in reorganization seems to be away from the joint school unit toward the consolidated school unit. Only 3 of the 41 joint school units operating in 1952-1953 have been organized since World War II, while 56 of the 60 consolidated school units operating in 1952-1953 have been organized since then. The evidence indicates that the joint school plan is losing ground to the consolidated plan. In fact, a number of school corporations on the joint plan have changed to the consolidated plan since World War II, and other schools are contemplating changing over.

During the past school year, seven additional consolidations occurred, involving 23 former corporations. A total of 170 former corporations make up the 67 consolidated school units now operating in Indiana. Of these, 120 were former township corporations. It is encouraging to note that a number of these former township corporations were merged into multiple township consolidations, which indicates that consolidation is taking place at the grass-roots level.

In general, it may be said that the progress of reorganization of school units, from the inception of legalized public education in Indiana about 150 years ago to the present time, has been sometimes characterized by "too much smoke and not enough fire." Many laws were passed to implement reorganization, but for various reasons not as many school units took advantage of the opportunity as might have. It should be pointed out, however, that in recent

years there has been a marked increase in the number of school reorganizations.

The future of reorganization in Indiana depends on numerous factors. One of the most important of these is the school reorganization law. It has been difficult for many communities to effect reorganization under the present laws because: (1) the legal interpretation of some of the laws is so complicated that some schools operated for years under what they thought was a consolidated plan but what in actuality was a joint plan; (2) in some instances the laws were so worded that only a few corporations could meet the conditions specified; and (3) minorities have thwarted the will of majorities.

To provide school people with a better understanding of the legal conditions of reorganization, there is a definite need for revision and re-codification of present school laws. Indiana school laws in general need to take more cognizance of principles of efficient school organization. Reorganization would be encouraged more if more state support could be offered as incentives for efficient local school reorganization without detracting from the foundation program for children in areas which can not now be consolidated. It is sometimes impossible to attach territory to a school unit, even though the territory should logically be attached. Local officials can block the will of the people because they are not mandated by reorganization laws to hold the required election. Islands of unwanted territory can be left out of neighboring consolidation areas. Other principles of efficient school organization are also ignored in Indiana reorganization laws.

The state can not legislate revisions of the reorganization laws until sentiment is built up on the local level to back up the state. Eventually, there will be revisions of the reorganization laws leading to more efficient organization of the schools. Consolidations such as those previously mentioned stimulate and nurture the kind of sentiment that leads to reorganization progress.

In the final analysis, the future of school organization in Indiana is in the hands of local communities. It is evident that the more than 40 reorganization laws passed by the General Assembly since 1873 have been largely ineffective. The only way to achieve effective reorganization of our schools is through local community effort and initiative. Reorganizations this school year at Kokomo and in Dearborn and Tippecanoe counties are outstanding examples of what communities can do to solve their own educational problems.

The State Department of Public Instruction is dedicated to help every community have the best schools possible. School reorganization is a state problem as well as a local one, and we shall encourage and implement local effort in every way possible. Recently Bulletin No. 216 was prepared to assist local school people in conducting their own school surveys to determine educational needs. This bulletin and similar educational materials are prepared for school people by the State Department of Public Instruction, Indiana University, and Purdue University. At the present time Indiana University and the State Department of Public Instruction are sponsoring two intensive studies of Indiana school reorganization. Findings of these studies will be available in the near future. During the past school year a research division was initiated in the State Department of Public Instruction to study persistent educational problems on the state and local levels. Reports of its findings are being made available every month to school people and the general public.

It is my opinion that how well we solve our school reorganization problems in Indiana in the years ahead will depend on how much local action we can engender. The finest plans and recommendations for school reorganization are useless unless they can be translated into action at the community level. We in the State Department of Public Instruction are pledged to work in every way possible to secure a better education for our Hoosier boys and girls.

PRINCIPLES OF REORGANIZATION

Forrest W. Murphy

In discussing any problem related to public affairs, most of us are aware that our listeners have much information on the problem and that nearly all have formed opinions on the topic. Indeed, many have wondered at the temerity of a speaker in attempting to present a topic so well known. This afternoon I find myself in the position of discussing with you such a topic.

I am sure that in this presentation I shall make many statements which are so obvious that they need little or no documentation. This I do as a personal defense. I know that, were I to omit some, you might feel that their omission indicated my unconcern for them. Their presentation is merely evidence that some forethought has been given to the topic.

In developing this question, I have tried to eliminate references to specific studies and to avoid, insofar as possible, rigid documentation. You know that the literature, both lay and professional, is filled with reports and their accompanying conclusions. Ready reference to these may be obtained through standard reference materials. I shall attempt here to focus attention in a relatively short time on the problem of reorganizing school districts, hoping that, as the preparation of this paper has had a tremendous influence in developing logical thinking for me, it may stimulate you in a similar direction.

In considering underlying principles which may serve as points of departure for reorganizing school districts, we must recall that American schools had their origin in neighborhoods in which close acquaintances pooled their resources of money and people for the purposes of educating boys and girls. It is true that the education of youth is the function or concern of all the people in the state, but American schools are community schools, which include only the children of a community, and their direction is largely a community effort. Even though we speak of a county-unit, township-unit, or even state-unit district organization, the people in the immediate vicinity of the school, those who are citizens of the school districts, are the ones who are primarily concerned with its success.

This situation has been promoted by the absence of a national system of education which has eliminated a uniform school district

organization in the states. In the same direction, most states have been slow or unwilling to include in their statutes controls which enforce identical patterns of school districts. When surveying state school codes, one is often impressed by the apparently small number of different types of school districts the general code describes, but, when one studies special acts permitting school district organization, the variety of school district organization is increased. Using broad categorical descriptions, 60 different school district organizations exist. Within these categories, considerable dissimilarity occurs.

This wide range of organization has its advantages because from these there is available a wealth of data which gives worthwhile information for the most satisfactory school district. Few, if any, district organizations are entirely without value, although many possess characteristics which far outweigh their disadvantages.

However, the variety has its disadvantages. One of our famous national documents says "accordingly, all experience hath shewn, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed." So it is in this case. Community after community, recognizing the inefficiency of its schools, often knowing both cause and cure, is slow to turn to new forms. It is this attitude and the aforementioned conditions which make discussions of this type necessary.

The public schools of America, in somewhat less than three centuries and a half of existence, have become so great a part of the culture that they are accepted almost as a matter of course by its citizens. Since nearly every native American has spent some years enrolled in some phase of the public schools, and since these schools have been free to the individuals attending, not too much attention has been paid to certain phases of public education that have a direct relationship to the efficiency of this institution. Most pupils, and practically all their parents, have been aware of the individual classroom situation. They know whether or not the teacher is efficient; they know something about the curriculum, or program of studies; they may even know something about the physical surroundings; but, generally speaking, there has been little concern on the part of either the child or the adult about the forces of intelligent and professional understanding which are involved in educational administration. Certain basic principles must be established for the direction of the schools.

A school district, in order to function as an efficient educa-

tional tool, must have sufficient enrollment to warrant the economical expenditure of the money appropriated for this purpose.

One of the first developments which occurred in the reorganization of school districts was the so-called consolidation attempt. In this situation, largely through the voluntary action of local citizens, small attendance units were consolidated into a single unit. This represents but a single attempt in the reorganization of school districts. But it is unfortunate that too often in laymen's minds this consolidation of attendance units has been considered as the one method operating in reorganizing school districts. Although in many reorganizing patterns it is necessary to eliminate certain attendance units, it does not necessarily mean that the geographical size of an administrative unit should be larger than the distance traversed by the most remote pupil attending one attendance unit.

Although the elimination of the small attendance unit need not be accepted as a basic principle in the reorganizing of school districts, it is important for those contemplating such change to realize that small attendance units are expensive to operate if a high level educational program is to be maintained. Little's study of 223 county school surveys found that the cost of operating larger schools was considerably less than that of small schools, providing the same program was offered. McLure found a similar situation in his study in Mississippi. To state this in a reverse manner, if the same program is attempted in the small school as in the large, there must be a corresponding increase in expenditures. In reality, although this occurs to a degree, the actual situation is the elimination of the better educational program and the substitution of one that does not meet the needs of the youngsters.

Therefore, it is true that a large school is the more satisfactory educational unit from an economical viewpoint with regard to both the number of dollars spent and the return received.

So long as a limited section of the school-age population was in attendance, so long as the instructional program could be geared to this limited section of the population, and so long as the society which supported the school was a relatively simple one, the services of the school did not need to be as extensive as they have now become. With practically all children of elementary age attending school, and with nearly 80 per cent of those of secondary age in secondary schools, the simple pattern of educational service usually found in the small school is obsolete.

It is obvious that, in a nation in which the population was as sparsely distributed as in the early colonial period, the develop-

ment of attendance units was the most important concern of the people of the day. In planning these attendance units it was only necessary that there be a school established so that the pupils attending would not have to spend too much time and energy in reaching school. And, of course, a distance of four or five miles to and from the school was not considered an insurmountable barrier in those days.

This idea of developing school districts containing a single attendance unit spread throughout the United States, and it was not until much later that the idea of developing a school district which contained more than one attendance center became well established. This situation created the need for defining the terms attendance unit and administrative unit:

An *attendance unit* comprises the geographical area and its population served by a single school and does not necessarily concede a local tax unit or have an individual unit of local administration.

An *administrative unit* comprises all the geographical area and its population served by a single system of administration—it usually possesses powers of local taxation and operates under the control of a local board, and it may be composed of more than one attendance unit.

Determination of the size and location of attendance units is not too difficult. Studies have shown that elementary school units with an enrollment between 175 and 300 and high schools with an enrollment approaching 500 are economical in supporting high quality programs. A second factor limits the time involved in transportation. While these two criteria are not the only ones to be considered, they may be considered limiting ones.

The enrollment of satisfactory administrative units is not so easily determined. However, if we consider the minimum unit high school enrollment to be 500, we could assume that it would require approximately two 400-pupil elementary units to provide an underpinning to maintain this high school enrollment. It must be remembered that larger enrollments will permit the introduction of more services improving the educational facilities. School districts of small enrollment must consider other devices to enrich their programs.

Since some school districts often possess several hundred attendance units, it may be suggested that, just as there is a minimum enrollment figure for optimum service, there is undoubtedly a maximum. Some evidence indicates that these larger districts do not

create a climate in which creative design appears. Some progress has been made in administrative organization to overcome the difficulty.

Geographical limitations must be accepted as a principle for consideration. Whether in sparsely or thickly populated areas, school administrators must accept educational leadership as a major function. So far in our society, even allowing for all the advances made in communication, no substitute for man-to-man relationships has developed as the best way for leadership to exert its influence. A major shortcoming of the heavily populated school district exists in the difficulty of maintaining this factor. In a large or difficult geographical district, it, too, must be considered. Better roads, new bridges, the automobile—all have increased the potential size of the school district. But time enters the picture; schools which require hours of travel in order for visits to be made to them are handicaps to personal relationships. It should be obvious that, if it is important to be concerned with the time pupils need to be transported to school, the time factor is important to administration. In addition to size, topographical characters of the district enter in this picture. Mountainous regions and the presence of waterways and other natural barriers are factors which do not promote satisfactory personal and professional relationships.

A third principle involved is the need for considering the socioeconomic life of a community in determining the limits of the school district. As late as the turn of the century, some urban centers contained two or more school districts. Since these districts were unrelated in administration and unrelated to the sociological factors, difficulties both political and economic arose. By 1900, practically all of the urban divided districts had been eliminated, and reorganization became a rural problem. Now, with the growing urbanization in America and its somewhat reverse procedure, the development of suburban communities, more attention must be given to coordinating school district lines with the socioeconomic functions of the community.

In many instances, school districts have been reorganized so that political and school district boundaries were coterminous. States which turned to the county-unit system followed this pattern. It is interesting to notice that two of the states which have most rigid statutes relative to county organization have partially recognized the sociological factor. In Maryland, the city of Baltimore, and in Louisiana, the cities of Lake Charles, Monroe, and Bogalusa maintain district boundaries on bases which are largely sociological.

County lines are usually artificial, cutting across community life, and where school districts and county lines are common, unnatural sociological associations often interfere with a functional school district.

Unfortunately school districts, even when not coterminous with other political subdivisions, have not been too much concerned with community factors. Often we consider gerrymandering as the exclusive property of state and congressional efforts to control representative government. A look at the map of the school districts in the various states will change this view. School districts sometimes grow by accretion, some of which is unplanned. At other times, sound bases for change are involved. Again, ulterior motives create the change. I recall a school district barely 1½ miles in width and 20 miles long—a strange shape when contrasted with neighboring districts, but not so strange when one notices two railroads paralleling each other through the entire 20 miles.

A fourth principle involved is the need for state laws which favor changing school districts. Many states have for some time had statutory provision permitting the union of school districts. Many of these in reality interfered with reorganization. As an example of this difficulty, one may cite a practice common in many states of requiring the majority of the electors in each of the districts seeking reorganization to be in favor of the plan. If four districts sought reorganization in which District A had 100 votes and Districts B, C, and D each had 1,000 votes, even though all of the voters in Districts B, C, and D approved the reorganization, 51 voters in District A could prevent the reorganization. Obviously a better plan would permit all of those living in a proposed district to determine the future of the proposed plan.

Closely allied to this is the need for state laws to encourage reorganization through state financial support. Frequently states have adopted formulae which have granted sufficient state aid for small districts to be able to operate at little or no cost to the local district. This has occurred when unusual allowance has been made for sparcity of population or for transportation or when distribution factors did not include correct indices for the wealth of the community. Under a former plan for the distribution of state funds in Mississippi, it was undesirable for a municipal district to unite with a rural district when the latter received equalizing funds, as the reorganization would deprive the new district of considerable sums from state sources.

Making provisions which will more adequately support programs in larger administrative units is usually more desirable than penalizing small districts by reducing state support.

If all the preceding policies were accurately established, there would be some districts which would be unable to support the costs of an educational program of high calibre unless more funds were expended from the state level on a rather undesirable economic return basis. The development of the intermediate school district, as found in New York and some other eastern states, is an answer. The intermediate district encompasses two or more constituent districts and derives its name from the administrative position it occupies midway between the constituent districts and the state.

In one respect, the intermediate district affords leadership and resources that one might expect from the state level. It also provides services which one might expect from the local district. The intermediate district usually has a board of trustees chosen from the constituent school districts. These may be members of the local district board or they may be other citizens chosen by the electorate of the constituent district. This board has the authority to establish a budget and to recommend a tax levy to the constituent districts. State aid is granted to the intermediate district. The intermediate district board employs a chief executive or superintendent who serves as a supervisory official for the services provided by the intermediate district. This board and this superintendent have no administrative responsibility and no supervisory authority over the constituent boards except as it may relate to the service the intermediate district provides.

The services most commonly provided by the intermediate districts are those which one usually finds in a well-supported school district. School nurses, school psychologists, curriculum specialists, guidance authorities, school plant specialists, and other specialists offering services with the combined constituent members provide a portion of the cost and receive a portion of the services. Thus the intermediate district is able to pool the financial resources of its constituent boards and to provide specialists who are capable of giving excellent supplementary service to the local districts.

Concern for the preservation of political controls which exist in the small district is a principle to be observed. Citizens in the small school districts fear that (1) the control of the school system will be too far removed from local influences; (2) the inclusion of larger areas may give those areas domination of the affairs of the school district; and (3) the small community will lose the prestige which it now holds as the center of the school district.

Numerous devices have been used to support this principle. In some instances, each of the districts included in the reorganization pattern elects a school board member. Others weigh each school district, and board members are allotted on these factors. Board members are chosen from political subdivisions which already exist in the new district. Partial but not complete adherence to the principle is established through those and other devices.

Recently a unique plan to meet this policy has been suggested:

> On petition of voters in a consolidated district a referendum would be held to decide whether to set up an assembly or continue with conventional school board control. If the assembly is approved, state authority would divide the consolidated district into not less than 7 nor more than 16 voting areas. No area would contain less than 6 per cent nor more than 15 per cent of the population. Each area would then elect to the assembly the number of representatives allotted by the state. The assembly would meet at least three times a year. It would have power to elect the school board (from among its own members) and to approve the budget. Other functions would be to receive reports, discuss educational policies, and advise the school board. School board members would attend all assembly meetings.

Although none of these satisfy the principle completely, each has been of value. This is an important consideration which must have legal sanction.

A corollary to the preceding may be a change in the concept of the county superintendent of education in those states where this office obtains. The county superintendent's office appeared late in the development of county government in the United States. In some of the southern states, the Civil War brought it into existence.

When this office appeared, a profession of school administration did not exist. Most administrative duties were performed by members of school committees. In fact, teaching itself had little to support it as a profession, therefore laymen felt competent to direct the school. In this environment, it could be expected that the office of the county superintendent emerged primarily as a clerical and regulatory service. Nothing was more natural than its placement in the elective organization, along with other regulatory and clerical offices.

As teaching assumed professional character, so administration entered a professional status. Urban centers, often as large as some counties in population, found the need of a professional leader and, unwilling to be tied to local citizens for choice, employed superintendents on the basis of their professional ability.

Educational leadership is a *sine qua non* for the modern school district. One of the major catastrophes relating to school district reorganization has been the failure of large school districts to provide better educational services than smaller ones. Much of this error can be placed squarely on the back of the chief administrative officer.

Since this position becomes of great importance, it must be occupied by one who can serve professionally and who is not burdened by the necessity of offering himself as a candidate to the voters, but who can be chosen by the representatives of the people on the basis of professional merit. Many responsibilities now placed on county superintendents are those which are better performed by the board. Relieving the position of these burdens renders it more effective in many phases of administration.

The historical impact of tradition has kept the office of county superintendent in some states, but the concept of the position has changed and the method of choosing the superintendent is new. But some states, e.g., Florida, retain the elected county superintendent, a situation which may not be as productive of sound administration as hoped for.

In South Carolina, a state in which district reorganization is recent, an interesting status has developed. Under its reorganization plan, the office of the county superintendent is retained. Within counties, school districts may be organized and it is possible that a consolidated school district and a county school district may become coterminous; when this occurs, both the district and the county have school boards and each employs a superintendent. In at least one county this has occurred; the result produces two administrative centers, one of which, the county, possesses little or no responsibility toward the school.

In Mississippi's school reorganization plan, this is eliminated, but should two municipal school districts occupy an entire county, the direct responsibility of the schools would be in the hands of the superintendents of the municipal districts, the county superintendent becoming a clerical, regulatory official.

Sound school district reorganization may not need the office of the county superintendent. Indeed, better organization may develop as districts tend to be formed with less consideration for county lines.

A most necessary principle underlying reorganization is the readiness of the people for the change. In a democracy, legal procedures follow the will of the people. The very term "consent of the

governed" implies this philosophy. Our statute books are full of unenforced laws which have been placed there either by a determined pressure group or by the action of a simple majority. The effective operative of any law depends on more than a bare majority. All or nearly all of those affected must consider them necessary. This is especially true in action relative to the public schools.

Promotion of this readiness factor relies on making all the data relative to existing and proposed conditions available to every citizen. There are many ways by which this may be achieved. Since my own state, Mississippi, is in the midst of a reorganization program, I believe a description of the procedures involved may have some value.

In 1951, a State Citizens Education Committee was formed which looked carefully at a total program of education in the public schools of the state. One of the items which received major attention of this committee was the multiplicity of school districts in Mississippi. The committee reported that there were 840 administrative units for white public schools, or an average of more than 10 to the county, and for 1,239 colored administrative units, or an average of more than 15 to the county. This gave Mississippi at least 2,079 administrative districts; most of the other southern states had fewer than 200.

When the information from the Citizens' Committee was presented to the state legislature, there was some skepticism relative to its report. This was shared by the Governor and by a number of state legislators. Accordingly, during the legislature of 1952, authority was given to the Governor to appoint an Interim Education Committee from the legislature to study the needs of Mississippi and its public schools and to make recommendations to the legislature.

This committee worked with great care with the aid of educational consultants and studied many of the plans in operation in other states. Several visits were made by the entire committee to states which had undergone recent reorganization. After all information became public property, a special session of the legislature was called in the fall of 1953, and for two months the problems of education in Mississippi were thoroughly studied. At the end of that time, an almost complete revision of the school code in Mississippi was enacted. One phase of this development involved procedures which would eliminate many of the small school districts and allow the formation of larger administrative units. Chapter 12, Section 1, of the Mississippi Code states:

> All school districts in existence in the State of Mississippi upon the effective date of this act are hereby abolished, but all such school districts shall continue to exist with all the powers, rights, privileges, and prerogatives thereof as now provided by law until such school district shall be reconstituted or the territory thereof consolidated with other territory as is hereinafter prescribed. As soon as practicable after the passage of this act, and in no event later than July 1, 1957, the county board of education of each county, pursuant to a survey of such county for the purpose of determining the educational needs of the county from the standpoint of the efficiency of operating schools and school districts, shall, by an order spread upon its minutes, consolidate the territory of the county in such school districts or reconstitute existing school districts so that all of the territory of such county shall then be included within such school districts as the county board of education shall deem necessary to promote the physical, mental, moral, social, and educational welfare of the children involved, the efficiency of the operation of the schools, and the economic and social welfare of the various school areas.

And Section 3 states that:

> Each school district reorganized or reconstituted under the provisions of this act shall embrace all the educable children of all races living within the district. A satisfactory plan of equalization of facilities between the races shall be submitted and approved as a prerequisite to the reorganization or reconstitution of such district.

The important part of this situation is to consider not only the reorganization factor, but also the fact that, through so long a period of study, the people of the state became aware of conditions. From the knowledge of these came a need for understanding. The action of the legislature proved some readiness existed; its provision for surveys and the formation of districts, by action at the local level rather than by state edict, gives greater impetus to readying citizens for action. Already activity is under way in many areas, opposition seems to be limited to a few.

This is an approach of one state; it appears to solve some problems. Similar approaches have been used elsewhere. Other states may secure aid from their experiences.

The purpose of reorganization is the improvement of the educational program to provide an administrative unit which possesses the largest number of factors which allow teachers to do a better job and which provide a curriculum within whose structure a sound dynamic educational plan may exist and expand. It is apparent that, when the principles described here are used as points of departure in a reorganization program, with all these guides and with others discussed here today, the results must finally rest on the

abilities of those entrusted with their operation. Without competent, professionally prepared teachers, the classroom is not a place for the youth of America. Unless school districts are directed by administrators who are competent, understanding, and forward looking, a bottleneck will be formed through which even the finest type of school district can not function.

THE COMMUNITY CONCEPT OF SCHOOL REORGANIZATION

W. Monfort Barr

We have heard discussed today the services that the state university and the State Department of Public Instruction offer to local communities that are considering reorganization of school administrative and attendance units. We have reviewed the progress in school reorganization in Indiana. Dean Murphy has presented an excellent analysis of the principles and problems of school reorganization. My intent is to discuss a particular phase of school reorganization—a phase which is unusually appropriate for consideration by a group of midwestern school administrators and architects—the community concept of school reorganization.

Reorganization of school units refers to the process of forming a new administrative unit from the territory of two or more former units. In Indiana it refers to the legal merger of school townships, cities, or towns into a single municipal corporation for school purposes. The operation of schools by joint agreement, so common in Indiana in the early years of the century, is not a true reorganization, since the member corporations maintain their separate identities. In fact, the existence of joint schools and wide-scale transfer of school pupils in Indiana is proof of the inadequacy of our existing school corporations to perform the function for which they were organized.

Throughout the Midwest the public school system developed as a local institution. The typical school was the district school that served the needs of the people in the immediate neighborhood. Control of the school rested with the patrons whom it served. The small district school became a center of activity for the neighborhood. It often served as the social and recreational as well as the educational center. Since it was a local institution, it was subject to the will of the people. The relationship between school and society was close and direct.

In Indiana the district school during the past 50 years has been replaced by the consolidated township, town, or city school. The area which it serves is arbitrarily fixed by political boundaries and often cuts across the natural boundaries of the community. The purposes of school reorganization are often misunderstood. Area in square miles, enrollment, and taxable wealth often become

issues in school reorganization, but they are of importance only as they relate to the prime objective. The prime purpose of school reorganization is not size or wealth, it is the creation of an administrative unit which is adequate for the operation of schools that best meet the needs of our boys and girls. Such a unit may be a county, a city, or a rural area. However, it usually will not coincide with any existing political or civil unit, since these were primarily created to meet governmental needs rather than school needs.

What is the community school and how is its successful operation in Indiana dependent on school reorganization? Olsen, in his *School and Community,* traces the development of the community school. The traditional subject-centered school of the nineteenth century gave way to the child-centered school of the early twentieth century. Since the 1930's, a further modification in the objectives of education has resulted in the growth of the life-centered community school. The community school is an institution concerned not only with individual self-development but also with social change. The interrelation of school and community has thus become a major interest of public education.

Many would agree with John Dewey that education has a responsibility for effecting social change and that one of the great problems of education in a democracy is the discovery of means by which education can perform this function. Many of the problems of modern society are the mutual problems of both school and community.

Among the purposes of the community schoool are:

1. To provide a curriculum which is tailored to the needs and interests of the area served by the school.
2. To provide an educational offering for adults as well as for children.
3. To provide leadership toward a better community.
4. To enrich the school program through use of the resources of the community.
5. To encourage democratic participation in school and community affairs.

The community school can be an effective instrument in maintainance of the American way of life. Change has been one characteristic of life in America. The problem of successful modification of our social institutions within this pattern of social and economic change is a challenge to us all.

School administrative and attendance units should be organized in such manner that the schools may strengthen the community

and contribute to the needs of a democratic way of life. The community concept of school reorganization is based on the philosophical principle that education is a social function. Our children can become better citizens through participation in community life. Democracy and education are closely allied. One of the major purposes of education in America is to prepare citizens for life in a democratic society.

Most of us here today are agreed that it is extremely difficult to conduct a modern educational program in an obsolete building designed for the subject-centered curriculum of 50 years ago. There is probably much less agreement with the corollary that the life-centered community school is difficult to operate in the inadequate school units designed for the "horse and buggy" economy of the 1850's. Yet, such is the case.

Consider the situation in Indiana. Immediately after the school law of 1852 was passed, 82 cities and towns were organized as separate school corporations. In each instance the neighboring territory, which comprised the trading area of the city or town, was necessarily excluded, since the Acts of 1852 provided that the boundaries of the city and town school corporation should be coterminous with the city and town limits. In 1954 more than 100 independent city and town school corporations are still operating under the same legal provisions. The community center is isolated by political boundaries, so far as schools are concerned, from the territory which depends upon it for services and upon which it depends for agricultural products, for a labor supply, and for customers. Aside from the fact that such an organization fails to provide for community educational units, it is not economically sound. Divisive forces and agencies do not strengthen community interests.

Only in the past few years has it been legally possible in Indiana to combine a city and township into a single corporation for school purposes. As of August 1, 1953, forty-two Indiana cities and towns had joined with 101 contiguous townships to form the nucleus of a community school corporation, as may be seen in Figure 1. The term "nucleus" is used advisedly, since additional territory which may be an integral part of the community can not legally be joined to the new corporation. An entire township or none of it must become a part of the school corporation, regardless of the fact that part of the township may and often does fall within the limits of another community.

An outstanding example of the incongruity which may result from the use of arbitrary political boundaries as school boundaries

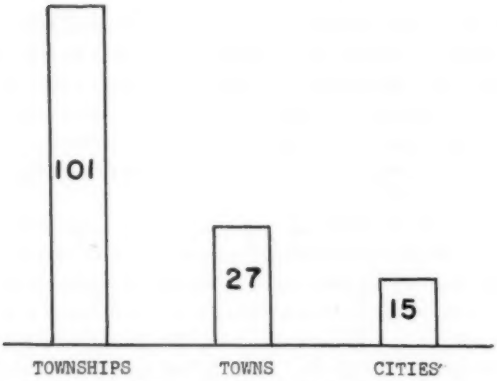

Figure 1. Civil Classification of Parts of Indiana Consolidated School Units in 1953

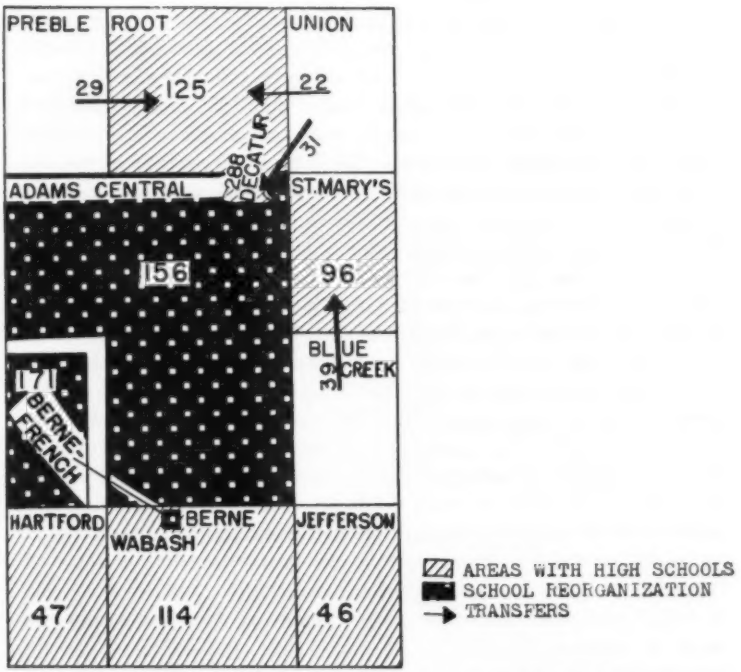

Figure 2. Transfer of High School Pupils from Townships in Adams County in 1950-1951 (Figures in shaded areas indicate high school enrollment.)

is found in Adams County, Indiana (see Figure 2). Often, however, such school corporations are justified as interim organizations.

Adams Central School Corporation excludes the independent school city of Decatur and the Berne-French Township Consolidated School Corporation. This completely violates the principles of community school organization. It resulted principally because of Indiana school law, which forbids any divergence between the boundaries of political townships and school corporations.

You men interested in school buildings are familiar with the fallacy of the term "temporary" school building. An interim plan of school unit organization is often also a fallacy. School organization tends to become permanent for several reasons: (1) school buildings are erected and exert a stabilizing influence on illogical school units, (2) a natural inertia argues against change in the nature of social institutions, and (3) a small high school often results in a pseudo-community interest which tends to conflict with the interests of the natural community.

Any resemblance between township, city, and town boundaries and natural community boundaries in Indiana is usually only accidental. The insistence of the Indiana General Assembly that political boundaries shall also serve as school boundaries is one of the principal deterrents to local reorganization of school corporations in Indiana. Admittedly the Adams County illustration is not typical in Indiana, but it does illustrate the difficulties that are encountered because Indiana law insists on the use of political boundaries for school corporations.

A school corporation should include one or more communities, if community schools are to be the objective. The corporation may well include several attendance districts, since communities often comprise several neighborhoods and villages. The school town in Indiana during the past 50 years has almost ceased to exist as a separate school corporation, principally for economic reasons. The number of independent school towns in Indiana has decreased from 253 in 1900 to only 30 in 1954 as a result of an 1899 Act which permitted the school town to revert to the township. Like the school district, the school town has almost passed from the scene in Indiana, as may be seen in Figure 3.

The nature of the population shift in Indiana during the past century has strengthened the school city. (See Figure 4.) At the time our Indiana schools were reorganized by the General Assembly in 1852, approximately 95 per cent of the population resided outside of urban centers. Many communities were rural in character. Trans-

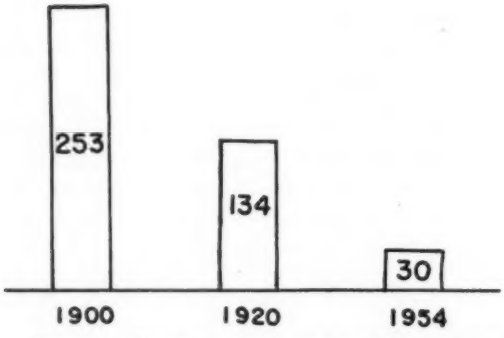

Figure 3. Number of Independent Indiana School Towns

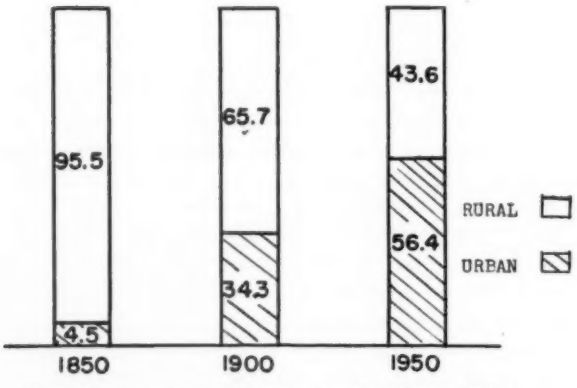

Figure 4. Rural and Urban Indiana Population Shift in Last Century

portation was difficult, and many rural areas were isolated for several months in the year. By 1900, only two thirds of the inhabitants of the state lived in rural areas. In 1950, fifty-six per cent lived in urban territory and only about 44 per cent lived in rural areas. During this same century, however, the township continued as the basic school unit in Indiana. The average 100 district schools per county have been replaced by central township consolidated buildings. Many of these, in areas of rapidly dwindling population, stand as monuments to the township school system in Indiana.

We are now engaged in the greatest school building "boom" that Indiana has ever seen. No community can afford to erect buildings for use during the next 50 to 70 years without consid-

ering carefully the effect on the education of its children. Likewise, no group of taxpayers can afford to ignore the rapid population shifts, the migration to urban areas, and the in-migration into Indiana. Our schools must be built to strengthen the communities of the future, not to perpetuate those of the past. We must guard particularly against ill-advised additions to buildings that are obsolete and inadequate for educational purposes. We must use prudence in the expenditure of capital funds, or a generation of school children may be ill-housed and ill-educated. We must certainly guard against the tendency to overbuild in areas of declining population—we must build only on sites which are certain to become permanent school attendance centers.

Solution of many of these problems should be primarily local, but much can be done by our lawmakers to facilitate a logical solution. Local schools must be organized within a framework of state law. The nature of legal requirements for school reorganization can do much to facilitate or to block orderly local development.

Techniques for the Determination of Community School Units

What is a community? Rural sociologists and educators seem to agree that it is a geographical area inhabited by people with certain common sociological and economic interests. The community often contains a number of small neighborhoods, but the everyday needs of the people are usually met by services obtainable only in a larger center. People usually make their daily purchases, attend church, seek their recreation, meet medical and dental needs, and attend lodges, clubs, or social gatherings in the larger community centers.

It is often difficult to determine the exact boundaries of communities. However, it is not difficult either by use of statistics or by plain "horse sense" to determine the approximate boundaries. One technique commonly used is to determine the area in which the principal daily needs of society are met.

It is important in conducting such studies to examine an area which is large enough to include the boundaries of the community. In Indiana such studies should necessarily include an area of approximately 400 square miles, about the area of an average county. In most states such studies have been most successfully conducted by committees of local citizens. In making such a study, a large sample of the population should be asked questions pertinent to the

determination of community centers and community limits. Typical questions of a community study in a rural area might include the following:

1. Where do you do your shopping?
2. Where do you go for recreation outside the home?
3. Where do you attend church?
4. Where do you work?
5. Where is your dentist located?
6. Where is your doctor located?
7. Where is your farm bureau?
8. Where is your local paper published?

Tentative community centers may be determined by listing the centers most frequently mentioned. Figure 5 shows the location of community centers in a sparsely settled Indiana county.

The next step is to select a single important service and to indicate on a base map the location of residences served in that respect by a predominant center. Next a tentative boundary line should be drawn enclosing the greatest concentration of the dots indicating

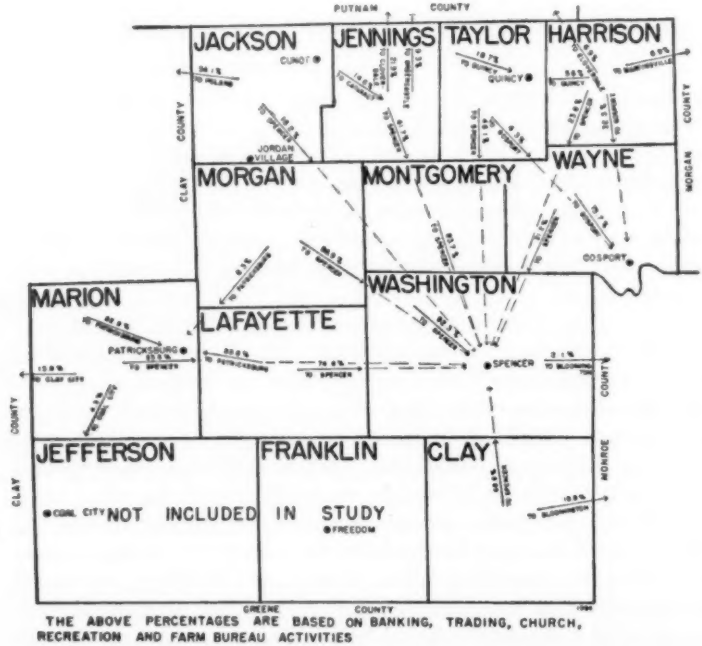

Figure 5. Community Centers for Owen County Citizens, 1954

the residence location of recipients of this service. Several separate maps should be prepared, one for each of the principal services.

The concentrated area about a principal community center can be determined by overlaying several of these maps. Within this area may lie a number of smaller concentrations of population which often prove to be suitable elementary school attendance centers. The entire area surrounding the dominant center is often suitable for consideration as a school administrative unit.

When approximate community boundaries have been determined, they may be transferred to spot maps of pupil residences. Determination of the tentative boundaries of the school administrative units and attendance areas readily follows. Natural barriers, direction of roads, and travel flow, as well as the number of pupils residing, should all be taken into consideration in the final determination of logical school boundaries. The Metropolitan School District of Martinsville has received national recognition for having met many of the requirements for a community school unit. (See Figure 6.)

This type of study enables local citizens to participate actively in the reorganization of their schools. Many states have successfully mandated such studies, reserving to a division of the State Department of Public Instruction the actual approval of such a unit before it is voted on by the local citizens.

It is usually considered important that trained personnel be provided in the State Department of Public Instruction to assist local communities in making such studies and to assist in determining the feasibility of proposed new units. I believe that Dean Smith would agree that this function of the State Department is certainly as necessary as the Division of School Building Planning and should be coordinated with it.

Local participation of this kind in school reorganization studies introduces a degree of objectivity into the determination of new school units. It also is in accordance with a basic principle of community school reorganization. The people should plan reorganization of their own schools if there is to be a democratic approach to this major educational problem.

In several states an important adjunct to local participation in school organization is often imposed by the state in the public interest. Where the people, because of apathy, neglect to solve their reorganization problem in a reasonable time, the legislative branch of state government may rightfully mandate the State Department of Public Instruction or a commission on school reorganization to

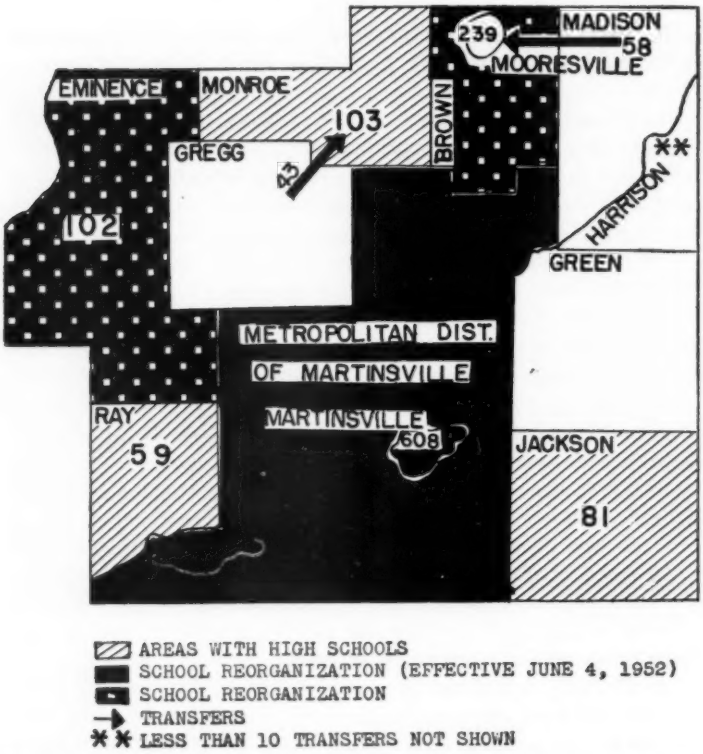

Figure 6. A Community School Unit in Morgan County (Figures in shaded areas indicate high school enrollment.)

effect needed local reorganization. To do otherwise would penalize the efficient corporations, since emergency or supplemental state support would be drained off by inefficient units.

I have not discussed local variations in wealth. I believe, personally, that it is the duty of the state to provide needed state support to impoverished local school units, if the local unit through reorganization has done its best to attain maximum efficiency. Consequently, I do not feel that difference in taxable wealth should become an issue in studies of local reorganization.

Early School Organization in Indiana

The study of events in the past often aids in facing the problems of the future. I would like to review with you briefly the

development of school organization in Indiana. Several basic principles have been adhered to throughout the years and certainly should not be ignored or lightly cast aside.

The Midwest early recognized the importance of public education. In the words of the Northwest Ordinance:

> Religion, Morality, and Knowledge, being necessary to a good government and the happiness of mankind, schools and the means of education shall be forever encouraged.

The framers of Indiana's first constitution, in 1816, embraced the principle of state responsibility for education.

> It shall be the duty of the General Assembly, as soon as circumstances will be permitted, to provide by law, for a general system of education; ascending in a regular gradation from township school to a state university, wherein tuition shall be gratis, and equally open to all.

In actual practice, this constitutional principle was implemented by permissive legislation which was often indifferently used in many areas of the state. As late as 1847, sentiment throughout the state was almost evenly divided on the question of public support of education. Local option on educational questions resulted in a chaotic condition throughout the state. A school district provided free public education only in counties where it was desired. Many districts made no attempt to use the available permissive school legislation.

It was at this time that Caleb Mills, Wabash College professor, spearheaded a statewide movement for a system of public schools which would accomplish the mandate of the Constitution of 1816. Hoosiers may well be proud of the forthright leadership of Caleb Mills, who was so influential in establishing the basis for Indiana's system of public schools. The Indiana Constitution of 1851 reaffirmed the principle of "a uniform system" of public schools, "equally open to all," a principle which during these hundred years has not been seriously challenged.

As we have seen, 35 years of sporadic attempts at operation of district schools passed in Indiana before reaffirmation of the principle of free public education in the basic law of the state. Concomitant with development of this principle grew the cherished Hoosier belief that local autonomy in school affairs was desirable. Although the School Law of 1852 at one stroke merged more than three thousand school districts into 938 township school corporations, local control of public schools was not disturbed. The new law kept the control of the schools in the hands of the patrons and

taxpayers of the township. A board of school trustees, consisting of three members, operated the schools. They were subject to the wishes of the patrons who, in annual school meetings, assisted the township school board in their deliberations. The General Assembly extended the provisions of the same law to cities and towns wishing to operate their own schools, and an additional 82 school corporations were formed under the provisions of this law.

Principles adhered to in the 1852 school law were not only the basic principles of state responsibility for education and local control of schools but also the prudential principle that a good unit of local government must be a sound unit of government, capable of performing the functions delegated to it. Although this principle of government may have been met by our units of local government a century ago, we are all aware that many civil governmental functions can not now be adequately maintained by our township, town, and city units of civil government. In fact, a constitutional amendment providing for changes in the organization of municipal government is now in the process of enactment.

The principle of local control of schools suffered a major blow a few years after the 1852 reorganization of schools, when the General Assembly in 1859, having previously abolished the annual school meeting, arbitrarily transferred control of the township schools from the township school board to the trustee of the civil township, where it remains to this day. I am sure that the members of the Institute of State and Local Government who are meeting with us today would agree that the dual civil and school duties of township trustees in Indiana are unique.

This résumé of the development of school organization in Indiana over a century ago may seem unrelated to the subject of our discussion—the organization of community school units. To those unfamiliar with Indiana school organization an explanation may be necessary. The organization of basic school units in Indiana in 1954, with few exceptions, is the same organization which was created by the Indiana General Assembly more than a century ago. Educational and lay leaders agreed at that time that the township school corporation was immeasurably superior to the school district which it was eventually to replace. The administrative unit was large enough to serve as a tax base for the customary nine district schools which it included. The districts, usually four square miles, were small enough that pupils were within easy walking distance of a district school. The township unit was small enough that the members of the township school board, using horse and buggy, could

readily inspect and supervise the schools. Consequently, some of the educational uniformity visualized by the framers of the constitution began to appear in many townships.

Early educational leaders, however, quickly recognized one drawback. The advent of improved "plank and corduroy" roads, the newly-arrived railroads in Indiana, and the rapid growth of many small neighborhoods was changing Indiana from a state of isolated pioneer settlements to a state of thriving communities, each with its major trade and business center. The everyday services formerly available in each pioneer settlement tended to be available only in the larger community centers. Many townships found the interests and loyalties of their residents beginning to gravitate toward centers in neighboring townships. The boundaries of expanding communities quickly crossed the political boundaries.

As early as 1873 the General Assembly permitted neighboring townships to establish joint district schools, with the accompanying provision that the property valuation on the tax duplicate should shift with the pupil. Transfer of pupils from one school corporation to another was also provided on condition that the school patron paid his school tax at the rate established by the receiving corporation and that the revenue from his school tax be made available to the school which the child attended.

In short, by 1873 the township had failed as a school administrative unit for several reasons.

1. The political boundaries of the township cut across the boundaries of the developing communities.

2. Inequalities in the taxpaying ability of townships quickly materialized. The township crossed by a railroad and fortunate enough to be the location of several business establishments rapidly outstripped its neighbors in available taxable wealth.

3. The township often proved to be incapable of providing facilities for "consolidated" graded schools. In fact, district schools in Indiana reached a peak in 1897, when more than 10,000 schools were operated in the state.

4. The township often was unable to provide more than one or two years of high school, since pupils of secondary school age were often few in number and tax resources were limited.

Indiana legislation from 1873 to 1927 was replete with legislation providing various means for schools to be operated jointly with neighboring corporations, for the formation of joint high schools, for the transfer of pupils from townships unable to maintain public schools, and for the transportation of pupils from one

school corporation to another. It was not until 1929 that the first Indiana law permitted union of two school corporations into an entirely new municipal corporation for school purposes. This act was repealed by a similar act in 1937, which has since been supplemented by a few acts permitting such a union under certain rather stringent conditions. Only four of Indiana's so-called "consolidated" school administrative units antedate the close of World War II. Only two consolidation acts, passed in 1947 and 1949, are actually being used in Indiana.

By way of illustration, let us examine the most recent of our school reorganization laws. Any township having a population of more than 3,500 and including an incorporated town having a population of more than 2,000 is permitted by vote of the people to reorganize under a board of education. Exactly four townships in Indiana met the above requirement. Three of the four reorganized immediately after the law was passed. Another example—any city of the fifth class in a township also containing a school in an incorporated town may operate a joint high school. An exhaustive state survey recently discovered exactly three townships in Indiana which meet this set of qualifications. A careful examination of the reputed 40 or more Indiana "consolidation" laws reveals that approximately 30 of these acts specifically prohibit the reorganization of school units and actually provide for a weak joint agreement similar to the 1873 act, an agreement so weak, in fact, that many schools find it illegal to issue school bonds under their joint school agreement.

No school law in Indiana permits divergence from the boundaries of civil corporations formed under the School Law of 1852 and acts amendatory thereto. It is illegal in Indiana to form a school corporation with other than political boundaries. It is forbidden to divide a school township and attach portions to logical community centers. Majority vote is forbidden by almost every Indiana reorganization law. Instead, provision is made for separate vote by existing individual corporations. Consequently a minority in one township can block formation of a new school corporation. This has actually prevented the formation of new corporations by at least 14 Indiana school corporations during the last year, although a large plurality in favor of the merger was voted in the entire area considering reorganization.

Let us forget for a moment the inadequacy of many of our school units. When the right of the people to reorganize and control their schools is blocked by legislation which actually prohibits reorganization, which contains so much "fine print" that practically no corporations are eligible to use it, and which results in

decreased state support to reorganized school units, then the principle of local control of schools is not being intelligently adhered to. We are permitting a maze of contradictory and ill-adapted statutes to stifle our local desire for school reorganization. Unlike the laws of the Medes and the Persians, statutes can be changed. However, judging by the experience of the past hundred years, they can not easily be changed in Indiana. During the hundred-year period from 1852 to 1952 the number of Indiana school corporations actually increased from 1,020 to nearly 1,200. This is the end result of a century of Indiana school reorganization.

A few consolidation or metropolitan unit laws on the statute books encourage the union of two or three inadequate units into a larger, but often inadequate unit, which may still conflict with the economy, the community pattern, and the traffic flow of the area. The objective in school reorganization should be a better administrative unit, not merely a larger one. Although enrollment has a relationship to efficiency and economy, it is only one of the major criteria which should be considered for reorganization of school administrative or attendance units.

Our archaic system of school organization in Indiana was designed to meet the needs of the economy of the 1850's. The system was intended to provide an administrative unit for a network of district schools and was based on political units which have been outgrown for both school and civil affairs. Many of our school corporations are as inadequate to meet the needs of the 1950's as the school district was to meet the school needs of a century ago.

Let us examine for a moment our Indiana local school organizations. More than 50 school corporations are "closed"; they have not made even a pretense of performing the function delegated by the General Assembly. More than 400 school corporations provide no education beyond the elementary grades. A maze of transfer pupils exists as proof that political school units do not meet the needs of secondary education. We have in Indiana 343 educationally inadequate and unduly costly small high schools, 46.6 per cent of which enroll from 7 to 100 pupils in grades 9 through 12. It is needless to enumerate further. We Hoosiers have become so obsessed with the belief that this law or that law can not be changed that we almost forget that the General Assembly has not only the right but a constitutional mandate to provide for a "uniform system" of public schools "equally open to all."

Forget for a moment the financial burden of operating more than a thousand separate administrative units. Forget the perpetua-

tion of the school system of the 1850's by allocation of supplemental funds to inadequate school units. Forget, if you please, the breakdown of local support of the schools in the 1930's. Forget, if you can, the mounting enrollments which are already overflowing our buildings. Consider instead the purposes of education in a democracy, and answer honestly the question: Are we in the 1950's as willing to meet changed conditions as were the educational legislative leaders of a century ago? They did not hesitate to adopt a new constitution in order to meet the needs of a changing economy. We seem to hesitate to come to grips with the major problem of need for reorganization of our basic school units to meet the changed conditions brought about by a century of progress in Indiana.

COMMUNITY CONCEPT OF SCHOOL REORGANIZATION

Paul R. Griesel

For my allotted time, I wish to explore the many reorganization problems which confront the State Department by phrasing a series of questions. My colleagues and I each have our own thoughts as to their solutions, but we need stimulation and refreshing slants which could throw light on these problems. In the published report of this conference, I will include an outline to clarify the discussion of these problems.

I. Division of school unit—
   A. What are the kinds of boundary lines?
      1. Artificial
      2. Natural—rivers, creeks, hilly regions
      3. Man-made—highways, railroads
      4. Combination
   B. How are the boundaries decided?
      1. Arbitrary annexation
      2. Vote of people of community area—of annexation
      3. Vote of people in whole district
      4. What remonstrance authority do they have?
      5. What happens to those persons excluded from district?
   C. What about the factors of wealth and children? In Martinsville, for example, one or two families could have voted to consolidate with Martinsville and lost the power plant to the city.
   D. Who is to administer the schools?
      1. In a part of two townships. What is the status of trustees?
      2. In a community that is too small to have a superintendent.
      3. In a community where there is a school board.
      4. In two townships (partial) in two counties.
   E. What is the force of the law of meeting the demands of people?
      1. What if the trustees refuse to act?
      2. What if the trustees refuse to furnish transportation?
   F. How will the division of taxing units affect budgeting and financing?
      1. Present law has civil and school boundaries that coincide.
      2. How can assessments be made and tax rates levied on portions of districts?

II. We now have many joint school units that desire to become consolidated school units. Under present laws, this is impossible.
   A. The consolidation laws ask for a resolution signed by the respective school boards and trustees. This is all right in the case of a trustee, but for a joint school, a city or town no longer has a school board as such, for it is abolished when the joint school is formed.

B. We have many school corporations that are operating as consolidations, but the law is so written that they are actually supposed to be joint schools. A legalizing bill is needed.
C. There is no provision in the law whereby a joint school can be disbanded, if, for reasons of size or inequities in cost, it is impossible to abolish the joint system. The same is true with consolidations, but we do not want them abolished.
D. There is need for more public education to show the favorable aspects of consolidation as contrasted to the joint school system.

III. At the state level, state tuition support acts to deter the formation of consolidation.
A. It provides no financial incentive to consolidation.
B. When a township and city or town consolidate, all or most funds for transportation are lost.
C. In many cases, all equalization funds are also lost.
D. A premium should be placed at the state level on consolidation.
1. Allow this loss to be written off over a period of years.
2. Give them special benefits over a period of years.
3. Use a combination of the two.
E. An authority should be established to effect consolidations of those townships that do not operate schools, after they, themselves, have first been given ample time to consolidate, within a reasonable time limit.

In my capacity in the State Department, I have very little time to sit down and think of educational philosophy because I am too busy trying to apply the laws that we have on our statute books now. Quite often you hear them throw a big blanket around a problem and say that solves it. That is all we have to do—just pass a law. That sounds pretty good, but I am afraid that not very many of those men have ever tried to sit down and write a law with all of its mechanics and with its various implications which would meet with the approval of all the legislators as well as the folks back home.

Maybe you folks in the audience can give us some ideas on how we can solve the problem of school reorganization. Dr. Barr mentioned the possibility of a community school, annexing a portion of the present school unit to a high school district. Let us assume that I am talking of township schools—I think it would be a rare instance in which we would want to annex part of a town or city. Let us say that you take a piece of property and add it to another one. What about the boundary lines? What are you going to do? Are you going to make them artificial, the same as political boundary lines, which cut through the cornfields and across the barn lots? Are you going to make them natural, following the terrain, the rivers, the mountain areas? Are you going to

make them man-made, following the railroads as Dr. Murphy mentioned, or following your highways? Or are you going to have a combination? We have many units in the state that could be subdivided along natural boundary lines if the law would provide for it. Now how are you going to decide where these boundary lines are to be? Are you going to have arbitrary annexation, giving the power to one school unit to go over and gobble up another school unit? Are you going to put it to the vote of the people? Or are you going to put it to the vote of only those people residing in the area concerned? What remonstrance do those people have if they are dissatisfied? What happens to the people whom you exclude from that district? You see that complications can arise, and you have to have answers for them. Otherwise the problems will be sent to the Supreme Court to be tied up for years. We have one law now that has been tied up in the Supreme Court ever since I have been with the State Department. They filed it shortly after it came in and, consequently, it might as well not be on the books.

What about the factors of wealth and children? There is a superintendent in the audience today who could speak better on that than I could, for he had a gobbling city council that just went out and swallowed up all of the industries surrounding the city. It didn't take the children—that was too much of a problem—but it wanted the wealth. So what are you going to do? Are you going to let cities gerrymander all over the terrain, taking the wealth, leaving the children—because you will have people like that in responsible positions?

As an example, let us take Martinsville, which Dr. Barr showed on the map a while ago. If it had been legal at the time that Martinsville consolidated, it probably would not have taken in the other four townships. It would have gone in a straight line, taking in the Indianapolis Power Plant—$12,000,000. It wouldn't have taken the children who went with it. But that was a part of the deal. Consequently, it doubled the wealth of the school district—the Martinsville City School District.

If you have a township which annexes part of another township, who is going to administer that school program—the original trustee, or the trustee of the area that was annexed? The unit is too small to have a school board. The tax rates and the finance laws in the state are such that the township trustee collects the taxes for the civil unit on the assessed valuation according to his political boundary lines. Now what are you going to do if you do

away with political boundaries? Who will get the tax money? You will have to change the structure of your whole finance to get that tax money where it belongs for school purposes.

What are you going to do when you have crossed county lines? You have not only the problem of choosing the administrator of the school but also that of levying the tax rates and collecting the taxes.

Now there is one problem that Dr. Barr and I have encountered on rare occasions—what are you going to do about mandating these actions Suppose that people vote to include that territory in a partial consolidation. What if the trustee doesn't want to do it? What if the trustee refuses to furnish transportation for those pupils? That's the trouble with most of the laws on most of our books today. I know that Dr. Barr disagrees with me on this. We have laws that are mandatory and they say "You shall." What if you don't? Well, it costs several hundreds or thousands of dollars to take it through the courts. A penalty is placed on the act and the offender can be found in contempt of the court automatically and fined for it.

These are a few of the questions that I have on splitting school units to which I would like answers before I go along with such a plan. As I see it now, most places in the state of Indiana should have the county unit system. This system is similar to those in Brown County and Floyd County. I know that the Research Division of Indiana University has recommended to several counties that they have it, but that is as far as they can go.

Now to get to our second problem. As Mr. Young said this morning, we have two different types of reorganization. We have consolidations and we have joints. Personally I dislike the joints for several reasons, probably the most important of which is that they increase my work about threefold, and I would just as soon see them abolished for that reason. There is no way under the sun that a joint school can become a consolidation, for the law says that a school board—a town school board—and a township trustee may sign a resolution to become consolidated. If you have a joint school, then you have lost your identity as a town board because you have a joint school board with the trustee as a member of the joint school board. So you have no school board, as such, that can sign that resolution to the trustee. It has been our recommendation, substantiated by several other state agencies, that, in a case in which a joint school wants to become consolidated, the best thing to do is to get everybody to sign that resolution.

There would be less possibility of remonstrance with the township trustees, the advisory board, the town council, and the city council interested.

Now the third question concerns the state funds in consolidation. Unfortunately, when the two units consolidate they lose state funds. One of the best examples of this that I know of is Bloomington. When Bloomington, Bloomington Township, and Perry Township consolidated, they lost around $47,000 a year. They will continue to lose that as long as they stay together and, of course, they can't separate. We should place a premium, I believe, on consolidation, but I don't know what is the best way to do it. It would be my personal opinion that units which consolidate should be given some added incentive, some added financial support. Others disagree, saying, "Let's eliminate that loss over a period of several years, as you do on your capital gain and loss income tax statement." Or you can have a combination of the two. To me it is immaterial. But there should be some way to place incentives on consolidation.

As it now stands, when a wealthy city school which has no transportation costs consolidates with a township school that has transportation costs, the city's wealth automatically wipes out any state funds that might be received for transportation. The same is true with equalization, because of the tremendous wealth in most city systems. It might be possible to add an incentive by setting up a system similar to those they have in other states. In those units that have no schools at all, a reasonable amount of time is given in which to consolidate with a neighboring unit, after which the Commission steps in and consolidates it for them. An example is a county up north which has two townships side by side. They have approximately the same number of resident pupils, but one township transfers all of its pupils to the other township. It costs the transferring corporation about 70 cents in tax rate. It costs the educating corporation about $1.92. It wouldn't pay the transferring township to consolidate. It is strictly a rural area. There isn't even a whistle stop in that township. Most of the people go into other communities to trade, and eventually the children move into those towns.

In closing I would like to make this one comment. The state universities have survey teams that go out all over the state and make surveys on consolidation and school building needs. The State Department, of course, has always had nothing but the highest respect for them. I have had people ask me why the universities

do that instead of the State Department. Well, speaking for myself, I am glad that we don't have to do it. Dean Smith will tell you that we have more than we can do now in approving the buildings that are going up all over the state, so we don't particularly care for the job. But secondly, a private survey team inspects the community needs and ability and makes recommendations. Any recommendations that it makes on school buildings has to be approved by our office. If we made the survey, it would put us in the position of recommending and then approving, which isn't a good policy.

When people come in to discuss consolidation, the first question I ask them is, "Have you made a survey, or have you had a survey made?" If they can't afford having a survey made, we have the bulletins and the sample copy of the forms which will permit them to make their own survey. All too often they go out and haphazardly slap up buildings here and there which, as Dr. Barr says, stand as a concrete or brick monument to the death of future consolidation. We sincerely hope that you folks will help us in this work of educating the public as to the need for consolidation in the public school systems of Indiana. An inefficient school in the north end of the state is not costing me a penny, as I pay taxes in Indianapolis. But it is not doing justice to its children—its children, not mine. It is a local problem. We are strong advocates for home rule. So the people need to be guided, nurtured along in what is the best educational solution to some of these school problems.

CREATING INTEREST IN SCHOOL NEEDS AT FORTVILLE

Richard H. Martin

It would be presumptuous of me as a newspaperman and amateur politician to attempt to analyze Indiana's school problems, even from a public relations standpoint, when it is unlikely that there is a single person in the room who knows less about the professional aspects of local school problems than I.

However, a friend and sort of father-confessor in school matters for my town of Fortville, Dr. Monfort Barr, convinced me that our Hancock County problem and our efforts to meet it locally might have some value as a sort of case study in confusion, good intentions, and perhaps, now, some glimmerings of light.

Fortville is a town of about 2,000 persons, situated in the northwest corner of the county. Adjoining it on the north, less than a mile away, is Madison County and on the west, again less than a mile away, is Hamilton County.

The Fortville community extends about five miles in each direction, with the possible exception of a substantial niche on the circle taken up by McCordsville, a town of several hundred independent souls.

The problem which has forced its way into the minds of some of us in the area is that the Fortville school is operating at well over 100 per cent of normal capacity and its enrollment is increasing at about 10 per cent a year.

Many of our students live not only outside the township, but outside the county as well. We draw from half of each of the two neighboring townships. The parents of these students are an integral part of our community. They attend our churches. They participate in our civic activities. They are officers in our lodges and sororities, and some of them, through their businesses, pay sizable taxes in our township.

It used to be that, when the fact of a crowded school was mentioned, the first retort would be, "Get rid of the transfers from out of the township." Most of us know now that that would be like cutting off a hand because we have but one glove.

To further complicate our situation, the McCordsville school, in the least populous part of the township, has a high school enrollment of 53 as compared with 212 at Fortville. The McCordsville

grade school, in the same building as the high school, has 131 students as compared with 461 in the Fortville grade school.

The McCordsville school building is in good condition and is used to less than one half of its capacity. The local residents guard the inviolability of their present school arrangement with an intensity that is sometimes startling.

Basically, I suppose, the first step in meeting a problem is to convince enough other people that a problem exists for you to have a fair chance of attacking the thing. Since the gradual crowding of the Fortville school did not seem to be causing general concern, and since it was obviously a problem which would soon be critical, several of us who shared this awareness decided to seek some action.

Several of these people were residents of the nearby townships who sent their children to the Fortville school, but who saw, or thought they saw, in the neglect of the school crowding a threat to the continued acceptance of their children as transfers at the school.

We at the *Fortville Tribune,* as the local newspaper with a responsibility to point out developing problems, naturally took an interest. We lent aid and comfort to those seeking to meet the problem.

Several "cracks" at the worsening situation had been taken over the years, but we started a more concerted attack on it in the newspaper in January of last year, shortly after the issuance of the report of the Indiana State School Survey Commission written by members of the Indiana University School of Education staff.

In an editorial entitled "Crystal Ball and Tea Leaves" we described the origin of the Commission, its political pedigree, and in general its conclusions. We laid particular stress on the seven principles determining a good local educational system as laid out by the Commission. The editorial suggested comparing the overcrowded Fortville school with these criteria.

The next month, we again pointed out, in an editorial called "A Problem: Two for One," that the number of first graders expected the following September was just about twice the number of seniors who would be graduated from the Fortville school in June. One room would become available, but two rooms would be required.

Discussions on Main Street and in organizations (there are 65 of them in Fortville) were also making people aware of the problem.

In two weeks we were able to run a news story that "Crowded Schools" was going to be the subject at the next P.T.A. meeting and that a representative from the School of Education at Indiana University would speak. The following week's paper used as its main headline, "Solve Own Problem, P.T.A. told; Local Areas Must Meet Their Own Needs, I.U. Professor Told Group Monday." That I.U. professor, incidentally, was Dr. Barr.

During the succeeding days a rumor, and small towns are rife with them, that transfers would not be accepted in the fall was heard. We checked with the trustee and then ran as our major story, "Transfers to Be Admitted Next Year. Lane Discusses School Situation at Chamber Meet."

Once it became definite that transfers would be accepted and no action would be taken locally by the trustee at that time, much of the interest in pushing ahead on meeting the problem died out. We waited for further crowding for our next effort.

It should be mentioned that early in this particular sortie, four of us visited Dean Wright and Dr. Barr on the campus seeking their advice on our problem. Their suggestions and ideas were very helpful to us.

Several of this group appeared before the legislative committee on education of the House at the 1953 General Assembly and also interviewed Wilbur Young, seeking legislation permitting the division of a township to join another township for school purposes. That died a-borning and, needless to say, we were more successful at Bloomington than at Indianapolis.

Last September third, five months after the previous flurry was over, and the day before school was to open, the *Tribune* ran an editorial on the three R's called "Readin', 'Ritin', and Rooms." In it we described the crowded condition at the Fortville school, mentioned that a neighboring community, Eden, was asking others in the county to join with it in meeting school needs, and concluded that:

> The Chinese (I hope they were Nationalist Chinese) have a proverb that "Even a thousand-mile journey must begin with the first step." How many an educational mile journey it is to ensure the future educational needs of the children of this area is unknown. But it won't get done before it's started, that's reasonably sure, and no one appears to be starting.

The next week the main headline read, "School Enrollment Reaches New Peak, 11% Increase Here; Vernon Township Has 857 Students." The editorial the same day was entitled "It's Getting

Crowded" and reported that the library was discontinued to make room for the Latin class.

The following week, the second week of the school year, the main headline was "Concern Voiced on School Crowding. Study of Future Needs Called Important as Recognition Spreads That Solution to School Crowding Will Take Time." The editorial the same day was "First the Facts" urging a careful study of the community's educational needs and resources before determining action to meet the problem.

To review the course of events simply in headlines misses the work done by several of the active people of the area. The *Tribune* simply recorded the results of its work. But here are the stories in headline form, as actually printed.

October 8: "Eden Kindergarten Mothers Discuss School Crowding. Set County Meeting." The editorial was "Eden Starts It."

October 15: "Parents Seek Plan for Solution to School Crowding." The editorial was "A Start in the Direction."

October 29: "I.U. Professor to Speak at Greenfield Monday. County Officials Asked to Attend Meet." The editorial was "Help Wanted," and invited people to the meeting.

November 5: "First Find the Facts, Says I.U. Professor. School Problems Must Be Solved Locally. Pledges Needed Aid to School Groups for Future Action." The editorial was "A Good Start."

November 12: "Mass Meeting on Schools Set for November 30. P-TA Sponsors Session to Discuss Crowded Schools." The editorial was "A First Test," charging that attendance at the meeting would indicate how many persons cared about the problem.

November 19: "Greenfield School Superintendent to Speak at Meeting November 30." The editorial was "A Step Worth Taking," pointing out that to discuss the problem was good but that we had to get the facts and not guess at needs.

November 26: "Mass Meeting Here Monday Night. School Problems to Be Aired at Local Session."

December 3: "Mass Meeting Votes School Survey. Committee Named to Guide Work. 120 Patrons Attend Session to Study School Problem." The editorial was "And Away We Go," with obvious implications.

December 17: "School Survey Committee Asks Broader Membership. McCordsville P-TA Is Invited to Name Unspecified Number of Directors. Committee Discusses Current Rumors." (Citizens of McCordsville began to feel that they were not properly represented in order to protect their interests. The committee offered to let McCordsville name as many directors as it wanted, so that it could completely control the committee if it chose.)

December 24: "McCordsville Group to Discuss Survey at Next Meeting."

January 21, 1954: "P-TA Appoints Committee Members. McCordsville Group Names 4 to Serve on School Survey." The editorial was "Congratulations" for this was a big hurdle.

February 18: "School Survey Committee to Meet Tuesday. Parents' Group May Consider Plans for Study of Local Classroom Needs. Session to Be Held at Fortville School."

February 25: "Division of Territory First Official Action by School Study Group."

March 11: "School Census Takers Begin Area Survey for Vernon Schools." The editorial was "Your Cooperation," which encouraged people to aid the survey by answering questions. There had been a rumor that a McCordsville group would ask others to refrain from answering the questions. This was purely fiction.

March 25: "Family Census Record Job Completed by Volunteers in School Community Area. Survey Committee Tabulates Results. Plans Next Steps."

May 27: "Fortville 5th and 6th Grade Pupils May Go to McCordsville This Fall. Enrollment Figure Will Determine Trustee's Action."

June 10: The editorial was "Needed: A Plan," which emphasized the need for interpretation of the survey figures.

And that is where we are now. The figures are being tabulated. Three of the 12 basic areas have not furnished their preliminary summaries based on the questionnaires. September school opening is a bare two months away. We have followed exactly the advice given us by Dean Wright and Dr. Barr. We have used the booklet published by the State Department of Public Instruction, *How to Study School Building Needs—A Workbook for School Survey Committees.* The Fortville survey thus far has followed the recommendations of the workbook.

We do not know any answers. We are still in the process of trying to find out what the questions are. It may take one more shot of a peak enrollment report to push the study through to completion.

We have found that the finest plans and recommendations of you specialists in school organizations are useless to us unless local people at the local level can translate them into concrete community action. Our experience in Fortville has shown that Indiana University's guidance, even in the very earliest stage, is extremely valuable. And we have had the interested help of the Indiana University School of Education and the survey workbook it developed. For both we are grateful.

THEORY OF SCHOOL DESIGN: THE SCHOOL BUILDING IN ITS CONTEXT

Richard Neutra

A theory of school design concerns the most practical issue in the world—the next generation, now in progress "from toddling to adolescing." We are supposed to do something for them while they prepare themselves to be succeeding individuals and the citizens of tomorrow.

Design is always an extremely responsible and dangerous undertaking; the less responsible, the more dangerous. It is not only *for* education, it is part of it, if we define education as a cluster of measures to take influence, especially on younger human beings. Their more plastic stage is physiologically well known, and the reasons why such early plasticity is later followed by refractory rigidity are of a basic, organic nature.

This is why speaking before educators and educational policy makers is like standing before responsible designers and architects, given the power to frame future life. These powerful gentlemen are almost like the real Politburo of the world, which concocts the destiny of mankind. This naturally sounds, and may well be, threatening for those who wait outside of the kitchen where the courses are being prepared to be dished out. In general, people who have delivered themselves into the hands of architects feel a justified anxiety.

If this world were completely static and unchanging, our task to design educational facilities would be sufficiently complicated. But, since it is by no means so and there is dynamic change all around, the problem is to provide and prepare for perpetual reorganization.

School buildings, plans, and details must be capable of recurrent reorganization for various reasons.

First of all, new materials, supplies, equipment, instrumentalities—I almost would have said gadgets and gimmicks—come to the fore on a million impressive advertising pages.

While we look over our near shore of the ocean of happenings to the distant horizon of a far future, the breakers of this kind of "progress" are most noisy and conspicuous, but they bring with them also a dangerous undertow. For all the foaming foreground activity we are liable to lose sight of depth and expanse. Education has

for thousands of years been deeply influential when carried on under a mango tree with a few disciples, not with a mass attendance provided by law; the costly instrumentalities of education were hardly in evidence and did not change from one fashionable novelty to the other.

There is a second and I believe more profound reason why schools of today and tomorrow must be different from those of yesterday. Quite apart from the boisterous glorified progress of materialistic technology, that is no unmitigated benefit and has introduced so much self-interference, there has been a stupendous advance in the pursuit, long recommended by philosophers. The recommendation was to recognize yourself and thus the human organism which underlies the individual.

The biological and physiological journals of the world have published more dependable papers and ingenious observation on the subject during the last three decades than the devoted study of Aristotle's writings has yielded during three millennia.

Design for the human being presupposes information on it and its operation. This information is deepening by leaps and bounds and will reflect itself in modification of design principles.

The theory of school plant design will not be speculative, but will be based on systematic observation of life processes, such as growing, maturing, fatiguing, assimilating, absorbing. Psychological repercussions of these processes, such as habituation, memory awareness, etc., are gradually being substantially underbuilt and more factually defined in their detail and concatenation with environmental factors by the experimentalist and the brain physiologist.[1]

The process of learning is one of the intrinsic life processes even in the prehuman, certainly in all the higher organisms. Learning is by no means confined to the classroom, but, according to our current principles of bringing up, it nevertheless has its focus there.

Classrooms should not be a world apart from living rooms and home surroundings if we do not want to bewilder and disturb children by split experience and irreconcilable duplicity. New trends in home building should therefore vitally interest the school designer and the accredited educator who determines the physical building program.

Family homes have shed many monumental trappings of the Victorian age, have become freer and lighter and less ponderous.

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1 *Survival Through Design*, a cycle of essays by Richard Neutra, Oxford University Press, 1954, treats design and especially school plant design as "applied biology."

Public buildings for purposes of education are usually constructed firmly and of materials resistant to wear and physical depreciation. This is as it should be. They last longer, and in the past they have, indeed, often greatly and painfully outlasted their usefulness as an educational tool and as an important element in the physical community or urban neighborhood they were to serve. This is not as it should be.

We must require a building to be good enough from an operational point of view to serve over the entire amortization period of, for example, a reinforced concrete or brick construction. To do so, it is clear that it will have to be designed with all the possible and available vision into a future of half a century.

It is uneconomical to leave vision aside. From a fiscal point of view, from the point of view of the accountant who wants to spread devaluation over a long period of years, the very best look into the trends and needs of the future is, indeed, a mandatory element of the program.

Should there be things coming along which our present means and budgets do not permit us to incorporate into the design at this moment, let us try to make reasonable provisions for them; let us make the projects flexible enough so that adjustment to broader and modified operation does not later become a heartbreaking task.

School design has been cursed and hampered by minimum standards and by preventive legislation's intent just to prohibit the worst. I have long maintained that constructive advance comes from the exhortative, optimistic effects of exemplary action rather than from frowning, sourfaced policing and prohibitions. I have for more than thirty years worked up model designs of schools, and a few proceeded from my illustrative efforts into realizations which were noted and even followed in California and in a number of places distant from each other. It proved to me that climatic or physiographic regionalism is a less formidable obstacle than is assumed in finding the common denominator for development of serviceable schoolrooms and school plants in many particulars.

Much more difficult seems the integration of a school into the communal scene and vitality in varying regions.

It is here where the new school must substitute for natural life experiences once so commonly available, but now so rare. It is no longer like the little red schoolhouse of bygone days in a rural district, merely concerned with bringing the supplement of the three R's to children who lead an amply practical and instructive life.

First, perhaps, this school must give up isolation and too rigid enclosure. Rudolph and Elizabeth Mock, criticizing school buildings, have called children "realists quick to detect something foul." What they have so often detected in the past was that their school used to be pretty far removed from "real" life and detached from their interests or any concrete interests. The school of the future will greatly regain prestige and attractiveness in the eyes of children when the place and its activities are suffused by the pleasurable atmosphere of common participation of all age groups. Learning is no longer an isolated chore for defenseless children cloistered with their taskmasters. It may sound provocative to classroom persons and administrators, but ways may be found to deepen the educational impact of schools of all grades by demonstrating that they are not strictly the domain of the "underaged" but are the heart of the neighborhood, intimately dear to grownups and full-fledged taxpayers.

As in the days of pioneers and their homesteads, children may perhaps again come to share spaces and facilities with adults. In many cases they may proudly act side by side, helping to serve a common purpose together with the naturally admired adults. In past periods the young ones have profited from this, mentally and emotionally. Ultimately, there may be found a way to have craft shops for all—stables, sties, a sort of a farmyard to engage in animal husbandry, a green nursery to practice garden craft. The rural world which is so much a part of civilization should not be entirely forgotten by urban beings if they are not to lose contact with the rest of mankind. It is realistic to be watchful against this damage.

Of course, small children will have their suitable play equipment and picture-book library wing. But the play fields, the library, the hall for physical education and square dances, as well as the cafeteria and the health center, may perhaps be developed as a good manifold investment for the multiple usage of all the age groups, mixed at times and segregated at other times. This means that the janitor's work multiplies.

School planning for the future should not lose sight of the obviously foreshadowed neighborhood centers which now are predicted as a certainty. Many-sided cooperation will be needed in an age of departmentalization, but the school board will and ought to have a leading position in such a development.

All more intimate communal and recreational facilities of a neighborhood will naturally exfoliate from the school, the kinder-

garten, or the nursery, where mothers congregate to discuss diets in the demonstration kitchen or wearing apparel in the sewing room.

Elementary and upper grade schools, where they exist around the planet, will play a proportionately different role in various regions.

The assembly space, the auditorium, the band rehearsal room, and the exhibition hall where acoustical and visual appeals to the community will be in perpetual preparation by well-guided amateurs; the discussion club and playrooms, where all neighborhood issues will find their lively hatching place, may equally serve many purposes of adolescent and adult after-work activities.

The entire plant of the future neighborhood center, with school facilities as its nucleus, used most hours of the day and all days of the year, may well be tested and proved by square-foot hours of full usage. This will serve as the livability index of the layout. It may greatly help toward a willingness to vote for bonds and funds.

One who has had training in articulate speech, in dance, crafts, arts, drama, or music enjoys, by acquired in-feeling, performances in these fields. The psychologists call it "empathy." Even small but cohesively active groups will make a neighborhood alert to otherwise dormant possibilities of active enjoyment, and professional performers of quality will find response and reward. Homogeneous neighborhood audiences, once so common and fertile in the world of the past, will be reborn and, on the stage as well as in this audience, children will be an integral part of the over-all group, as they have been throughout the ages.

Multiform special gatherings of face-to-face scale are as important in cementing a neighborhood or a school attendance as an occasional total assemblage. The neighborhood community center, clustered about the school as its core, is not a monumental institutional affair to be viewed only in an overawed glance. It is, as we said, a multiform elastically articulated complex to be enjoyed, one piece after the other and without competitive distraction of its parts. In fact, neither the monumentality of palatial royalty nor any kind of the imposing style of authoritarianism seems to fit for the child as well as for the adult of tomorrow.

Plenty of human charm and human scale will be needed. Wherever possible, a one-story layout with various green courts, lovely landscaped wind-sheltered patios, and connecting covered walks may prove more flexible for partial modifications and also more economical to construct than a fireproof, multistory, voluminously boxed-together affair.

And what about the school plant itself in the midst of this neighborhood and community context? What principles will guide the design of its principal rooms to learn and to teach in?

There are principles that seem to underlie a contemporary philosophy of education, broad features that characterize the views of this new morning.

The physical structures of schools must further the trend to emphasize and permeate or reward cooperation rather than competition. Children who enter a classroom now will not sit in a sort of isolation parallel to each other and silently or only furtively whisper to neighbors at their screwed-to-the-floor desks while supposedly listening to a sermon resounding from the blackboard. The signal of a bell may not always switch their minds from all arithmetic to all spelling for a measured forty-five minutes or so. Their interests, their stimulation, their succeeding, growing beyond "periods," will be in teamwork, by helping rather than by outshining their fellows. A coordinated muscular and sensory activity will call for flexible grouping of humans as well as of furniture, so as to adjust the educational environment to varied and frequent concerted efforts. A very gradual progress may be needed.

More space must be provided, with more diffused light, light where needed from more sides, less sleepy hot-air cushions around trainees, less fixed enclosures and more extension into the outdoors, and less mere heating systems with pollution of the air for economy's sake. Insulation of acoustical aids toward quietness, and reverberation that is well controlled toward more distinct articulation of whatever sounds are offered, will be provided. Visual aids will be important, not only to the presentation of a particular subject, but also so that the children's mental development at large can gain by clarity and simplicity and sensitivity of design applied to the building itself. Its clean-cut spaces, illumination details, and color schemes are of educational influence themselves.

Even that well-known sour classroom smell must be a consideration of the architect. Stale exhalations must not become a perpetuated antistimulus. Surface materials which have a tendency to absorb them, accumulate them, and continue to give them off again must be avoided.

Orderliness in everything used and cleanliness of all finishes must be restorable with ease and to the conscious pleasure of the trainee. The building must not pose nuisance problems and chores devoid of such a potential pleasure accent. To see oneself in a spick-and-span, clear-colored surrounding is in itself a momentous

conditioning to the mind of a young person. And the scale of the whole and all its parts must not be cruel and foreign to the child in his particular age.

Once the ever-present influence of the physical environment is recognized as an educative factor of the first order, the general as well as the specialized learning room, the open courts, and the play and entrance grounds will all take on a deep, inspiring significance. They are ingredient elements of an education-bound composition; and by this very reason, continuity and integrity of design must be accomplished, and within it abrupt gaps and cleavages must be avoided.

The typical classroom should be arranged in one-story wings enjoying liberal contact with the outdoor grounds, both visually and by physical egress. On many friendly-weather days the instructional area can be interestingly widened by adding to it a bit of the outside space. The strict division of life into one area outdoors, that is for recreation only, and one indoors, that is for mental work and absorption is erroneous in the light of anthropological precedent and research.

While structure and shape of the cross section of classroom wings might have to be more or less rigidly established for the sake of building economy, it may be possible to make acoustically tight cross partitions and fitted-in workbay furniture and material storage compartments that are removable and re-arrangeable. It may well be expected that educational procedure will remain sufficiently subject to change that adaptability of the physical plant may always hold an advantage.

The typical classroom can provide an ample light influx from the corridor wall. This "breather partition" may, for example, consist of a series of exhibition cases with obscure and clear glass on either side and a continuous, semi-vacuum, hollow glass black skylight above.

Such exhibition cases thus become a source of well-diffused illumination. The visual aids and exhibits are to be displayed in a dramatically impressive illumination, and may grow into a significant ingredient in the educational appeal. Sink and drainboard counters are placed in designated areas or in adjoining workbays of a size corresponding to the described exhibition spaces.

The sunny side of the classroom is well sheltered by roof overhangs against concentrated radiation, but provides ample egress to the classroom lawn patio surrounded by substantial hedges. The typical sliding glass partition also permits a free combination of out-

door and indoor instructional area for utilization. A sloping ceiling aids the downward reflection of agreeably and wholesomely diffused light into the classroom.

The classroom corridor has here been added to the instructional area by simultaneously serving as an exhibition hall, and it also offers room into which ventilated standard lockers may be built in where need be, to practically form an outer wall.

In every region and locality there are many specific problems to be studied by the school architect. They may concern the budget; the climate; the instructional, administrational, or managerial features; or the gradations that prevail in obtainable materials. A careful appreciation of all these conditions and an ability to integrate part solutions into one over-all design will yield school plants of lasting usefulness. It can only be hoped that diversity will not overgrow the common purpose of education, which, after all, is the harmonization of contemporaries, all those who have the common fate of dwelling simultaneously on this shrunken globe.

Our country has undoubted leadership in public education, not in budgetary matters only but in many other respects. Whatever we develop in buildings and methods will become meaningful to our fellowmen in less advanced regions. This may not be lost sight of, as education can aim at mutual understanding and peace.

EDUCATIONAL IMPLICATIONS OF SURVIVAL THROUGH DESIGN

Darell B. Harmon

When I left college I had some queer ideas about education. I wanted to be a student who was concerned with the synthesis of at least five different areas, because I thought four different areas were involved in school planning. I wanted to combine educational philosophy, psychobiology, psychophysiology, child development, and design. I have done a good deal of talking about various aspects of that combination. Anyone who knows me knows that I talk constantly. Incidentally, on several occasions I have been left speechless. It has been embarrassing, too. On one occasion a good many years ago, I was at a meeting where John Dewey was describing his philosophy of education and then, without any notice in advance, I was asked to get up and summarize what John Dewey had said about his educational philosophy. I couldn't do it. Some years after that I was invited to make a critque of Adolph Meyers' presentation of his psychobiology and I couldn't do that in front of the father of psychobiology.

Now I have been asked to lead the discussion in an area in which I have been a very hesitant elementary student, and do that before the man who is really the leader of it all, Mr. Neutra.

I would like to comment seriously on a few things. One thing Mr. Neutra said at the beginning was that education is the exposure of the child to the right kind of influence. We have had a multitude of definitions of that word "right" in our educational planning. For a good many years some of the interpretations of educational planning have taken the form of saying that the right influence is that which trims down your child, or eliminates certain innate perversions that he has, in order to socialize him or indoctrinate him with social characteristics. That was followed with the idea that education, or the right kind of influence in the child's education, was that of seating him in a straight, rigid seat, keeping him quiet, and pouring information into him. And now we are talking about the right influence as that which develops the total child.

Those first two concepts of what the right influences were also brought some concepts of what the teacher, the curriculum, and the plant should be like. The concept of the right influences

said that we should discipline out of the child the innate perversions that he brought into this world, and pour information into him so that he would become a human encyclopedia. Both of these concepts kept the child passive and actually treated the school structure as though it were a container in which the child was kept from things much more interesting. I think we have many relics of that particular influence in our school planning. As we have found out that children actually learn by activity and participation and that the whole child is learning, we have also begun to see that those are derivatives, to a large extent, of adaptation, one of the psychophysical functions.

When we see that total activity concept in learning, we also realize that the school plant is not a container used to keep the child in one place or away from the things that are more interesting or challenging to him. The plant is really a part of the teaching situation because, when we look at the total child, we begin to see that it is actually the physical surroundings, their organization of energies, and their space limits that set him into action utilizing the generalized behaviors of innate growth. A teacher takes those generalized reactions that are produced by the energy surroundings and the physical limitations of those surroundings and directs them into certain paths or activities out of which comes modification of structure or behavior to make the child a useful member of society.

The child's innate capacities are made useful to society through their specific development. Such development comes as a result of activities that are stimulated by the plant in which the child is going to school. As Mr. Neutra implies in his book, we must quit thinking of schools as containers, of education as something that we pour into children, and of design as something that was derived outside the experiences of the individual, and we must start building in terms of the psychophysics of the action that makes for the total development of our children.

In the light of what we know about that second teacher of the child, the school plant, I would like to close with this comment that I also got from Mr. Neutra's book: We can not compromise a school building because, if we do, we are compromising the child, and if we compromise the child, we are compromising our society. That has been too much compromised already.

VISUAL APPRAISAL OF DESIGN FACTORS

C. A. Winkelhake

Introduction

Modern education should determine contemporary school design, or, in the value judgment language of the designer, form follows function and function determines form.

A Bit of Educational History

During the first quarter of this century, the "lock-step" curriculum with its uniform memorization of facts and skills made no provision for different capacities and rates of progress among children.

During the first quarter of this century, however, the uniform memorization of uniform subject matter did not mean educator satisfaction with "content-centered" schools. Evolution in educational theory during this time included the search for a functional curriculum. For example, as Brownell said recently: "In the first decade of this century research demonstrated the invalidity of the Doctrine of Formal Discipline. It came to be seen that learning consists, not in the training of supposed faculties but in the acquisition of ways of behaving—ways of perceiving, of thinking, of acting, and of feeling."[1]

The revolution in arithmetic provides good factual material to illustrate this bit of history. For example, in their very early search for a functional program in arithmetic, educators tried to find out what should be taught in arithmetic. They began to inquire, around 1910, into how adults used arithmetic. After a period of about a decade their inquiry revealed some significant results. They found, for instance, that some of the arithmetic skills they taught were too advanced, some were too complex, and certain ones were not used by adults.

Educators use the phrase "the reductionist movement" to describe general curriculum activity during this period. In Brownell's phraseology: "The new broom swept clean." The reductionist movement marked an important forward step in the search for a functional program in education. Thus, for example, the serious

[1] Brownell, W. A., "The Revolution in Arithmetic," *The Education Digest* 19:28, May, 1954.

study of the content of arithmetic established the social aim of arithmetic. Frequency of adult use became the social-utility principle of arithmetic. It served as the basis for selecting arithmetic content. Likewise, in a more or less comparable way, the social aim of other fields of content evolved and became a criterion for the determination of new subject matter.

A Bit of Design Background

The foregoing bit of educational history dovetails interestingly with the background of contemporary design. The early search for an architecture based on function coincided loosely with the evolution toward a more functional program in education. The concentrated search for a functional program in education got under way about a decade earlier than the search for a functional program of design in school architecture. During the past two decades an increasingly functional program in education paralleled a quickened movement toward a functional program in school design.

School designers began to look at education from a functional design standpoint just about the time that the social aim of education made definite, clear-cut progress in the schools of America. The school designer's broom also "swept clean," and he inaugurated what could be called "a designer's reductionist movement." He looked at the singular social aim of education and began to design school buildings according to it.

School designers profited from one of the important innovations of contemporary house design; namely, the open plan. "A house with an open plan differs from a house with a traditional plan in the arrangement of the main living space: instead of being cut up into boxlike rooms, it is one free-flowing space . . . one compound volume, designed for different uses." [2]

Continuous, fluid space in contemporary architecture evolved in a manner unlike the handling of space in past eras of architecture. And the contemporary emphasis upon enclosed volumes rather than heavy masses affected the whole form of the school buildings, especially its plan layout and the relation of building to site.

From the school function and classroom function standpoint, the social aim of modern education led the early functional school designers to incorporate modified versions of the open plan in their school designs about two decades ago. Today, functional school

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2 Museum of Modern Art, *What is Modern Architecture?* Simon and Schuster, New York, 1946, 36 pp.

designers respond to the social aim of modern education with increased versatility and success through open and informal, fluid-space planning.

School designs today intend to accommodate a multiplicity of activities. The children in a classroom gather together in one large group. They break up into a number of small groups for various activities. They function on an individual basis, then go back to small groups, and so on. Upon closer inspection of today's typical elementary classroom design we find various rectangular shapes rimmed by built-ins and/or movable storage and service units. Book shelves, curtains, arrangement of furniture, movable chalkboards and tackboards, "teaching centers," etc., often divide today's typical classroom into different work or activity areas. In addition to these general, informal features, some classroom designs suggest space division into quiet areas and noisy areas—by varying ceiling heights, for example. Clerestory sections often lend themselves to this sort of space division. Also, space division into different areas often results from brightness and color variations in structural and finish materials.

Low roof lines today accentuate designs that blend into residential settings. Long horizontal planes and natural building materials blend into surrounding landscapes. A natural material on the exterior of a school building often furnishes a predominant design character. Interiors are developed to resemble the child's home environment. Design details carry through in this resemblance of the things likely to be common in the child's home, such as beam ceilings, corkboard and plywood walls, asphalt tile floors, and colorful decoration schemes. In general, contemporary school design exteriors and interiors suggest themselves as warm, friendly places in which to live.

Further, in accord with the social aim of education, careful articulation of classroom units and other areas of the school, joined by outdoor covered walkways and covered areas, allow the children to associate, to socialize, among the various informal parts of the total school building and grounds complex.

Current Trends in Modern Education

A comparison of 1954 school function with 1924 school function leaves no desire to return to the prescientific knowledge period of a content-centered curriculum. Such a comparison, however, does leave serious desire and intent today on the part of a growing number of persons, educators, and educative-minded laymen to move

toward a better balanced program in education. Sound evidence indicates that thoughtful educators today are in energetic pursuit of this intent.

Current trends in sound educational thinking point unmistakably to a program balanced according to the needs of both the child and the culture. For example, Hanna said recently that he could not agree with those who insisted that they taught "the child," that they were not at all concerned about subject matter, and that any content was of equal value with any other. As Hanna thoughtfully pointed out: "Children learn **something** and we are definitely concerned that this something be good subject matter."[3]

Back as early as "1920 or 1925 the popular child-study movement had evolved into the modern scientific inquiry into child growth and development. Physiologists, psychologists, sociologists, and anthropologists all were acquiring more complete and more trustworthy data concerning child nature and concerning the changes to be expected in the individual as he moves from infancy to adulthood. As a matter of course, these new data had their impact on education." [4]

An important consequence of the new data resulting from direct study of child development and behavior is the recent emergence of a very sound, and a very forceful, concept; namely, that a truly functional program in education must include sufficient provision for meaningful learning.

The revolution in arithmetic again provides very good material to illustrate these current facts. Thirty years ago, a mechanical mastery of the skills of arithmetic disregarded any concept of meaningful learning. No thought was given to what meanings, i.e., what principles, relationships, ideas, and generalizations were essential to learning arithmetic most effectively. But today, on the basis of direct study of the learning process, thoughtful educators conclude that arithmetic unquestionably has a mathematical aim as well as the social aim set for it several decades ago. They systematically conclude that arithmetic should be taught as a part of mathematics if it is to make sense to children.

On the singular basis of the social aim of arithmetic, we may rightly conclude that "the new broom swept clean." On the enlarged present-day basis of the social aim and the mathematical (i.e., the "sense and understanding") aim of arithmetic, we further rightly conclude, along with Brownell, that the new broom swept a

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3 Hanna, P. R. "We Teach Both Subject Matter and Children," *NEA Journal* 43:273, May, 1954.

4 Brownell, *op. cit.*, p. 30.

bit "too clean." Viewed from another vantage point, 30 years ago arithmetic was taught as a part of mathematics but certainly not for the reasons of scientific evidence that did not then exist. The scientific reasons resulted from direct study of the learning process during the past 30 years.

Thoughtful educators today affirm that method and content in general (i.e., number experiences; language experiences; social, health, science, and creative experiences) must be both meaningful and built into the structure of living. They consider both aims fundamental and essential to a functional program in modern education. And they actually attain both aims today under conditions of good instruction.

Contemporary School Design

Now let's take a look at some current trends in architecture and school design.

Let's begin with the words "design expression." These words cover a multitude of things in contemporary architecture. They often come into play just when a designer can no longer (logically and objectively) satisfy his basic design maxim that function determines form. Stated in a more general way, contemporary designers often justify their design procedures and results on the verbal basis of design expression. Design expression, however, frequently runs counter to the demands of both function and structure.

Pretensions of design expression often appear to hide ignorance of design function in a way uncomfortably comparable with Roger Bacon's truism that thirteenth-century science was "pretensions of knowledge to hide real ignorance." Interestingly, serious students of design especially note this insufficiency with regard to the functional demands of the school.

For example, Hudnut stated recently that he sometimes thought that "the architects who build our schoolhouses know very little about children; their cruelty could not otherwise be so deliberate." [5] Or again, an evaluation suggestion of two years ago by this writer that "Each individual school planner and designer ought to use some reasonable measure of evaluation on himself." How often did he (the school designer) seriously consider and reconsider in the designing of his last school "the fact that a child's response is not inherent?" [6]

[5] Hudnut, J., *Architecture and the Spirit of Man*, Harvard University Press, Cambridge, Mass., 1949, p. 242.

[6] Winkelhake, C. A., "Planning Research and Educational Function," *Progressive Architecture* 33:110, September, 1952.

School designers looked at education with a functional gleam in their design eye just about the time the social aim of education made its most clear-cut pronouncements and advances. As indicated previously, the early functional designers established their own reductionist movement, so to speak. They looked at the singular social aim of education and began to design school buildings according to that singular social aim.

At that very time, however, the fact that the function of education was on-going and dynamic did not get through to them—at least, it did not get through to them sufficiently to affect their design procedures and their design solutions. School function had certain well-established features and certain identifiable on-going characteristics long before school designers looked at it seriously for the first time. No matter that these school function characteristics were traditional or recently acquired, when they took up their basic value position that school function should determine school form, the early functional school designers should have looked at total school function. Instead they took only a partial look and saw only part-function.

In many respects, the early functional school designers understandably saw school function "in a partial mist" and proceeded to overlook a goodly portion of that function in their design translations and solutions. Unhappily, however, the large majority of school designers have not taken more than that partial, misty look—even today.

In modern education with its changing goals and enlarged aims, scientific knowledge and the experimental behavioral sciences of childhood answer what is or is not consistent with the nature of childhood and effective learning function. The understanding aim of education today distinguishes between content and method. It likewise must distinguish the light configuration, heat configuration, and sound configuration that should prevail in the design composition of the physical classroom.

For example, reading activity amounts to big-time school time today. Experimental results support the integrated way that reading is taught and learned today. The experimental results of Postman and Conger at the University of California, at Berkeley, showing usage and strength of verbal habits, significantly determine speed of recognition rather than sheer frequency of visual exposure. [7]

It is still reading—actually more so—since both the social and

[7] Postman, L., and Conger, B., "Verbal Habits and the Visual Recognition of Words," *Science* 119:671-673, May 14, 1954.

the understanding aims in today's better balanced program of functional education are being attained under conditions of good reading instruction, within complex, smooth running, classroom situations.

How does contemporary school design stack up against the impressive reading task that confronts youngsters in school today against the mathematical aim of arithmetic, and against the total sense and understanding aim of total modern education?

Unhappily, not very well. Sound control in school design today amounts to "brute force" dampening. A ceiling of acoustic tile fails to consider the selective sound frequency ranges and requirements of school children at their various developmental levels of growth and behavior and learning.

What about classroom lighting and light control? Upon comprehensive analysis, light control in school design today amounts largely to a "light flood." How many school designers today continue seriously to question brightness levels and differences if the question interferes with a pet cross section or a pet type of light fixture? If it interferes, then nothing short of "exploding eyeballs" seems to matter.

What about questions of effective visual communication? Lighting a classroom for effective communication does not boil down to a lone question of shades and shadows on textbooks. It is just as importantly a question of the shades and shadows of communicative gestures among teachers and children. The light pattern of any facial expression, the light modulation of any concrete object, the light definition, precision, and accuracy of any abstract symbol—these are the "innards" of visual information and communication in today's classroom.

Configurations of sound, heat, and light integrate physical structure and school function. Sound, heat, and light configurations serve, so to speak, as "space-bridges" between structure and function. They effectuate the visual dynamics, the auditory dynamics, and the thermodynamics of school children and teachers.

What about questions of the growth, development, and effective body mechanics of school children? For example, what school designers recently gave sincere consideration to the social and physical well-being of school children? A limited number of contemporary designers did this when they attempted to base their classroom designs on both the social aim of modern education and the implica-

tions of the pioneer classroom environment experiments conducted by Harmon in Texas.[8]

Kephart, Professor of Psychology at Purdue University, in January of this year, reported the results of his West Lafayette, Indiana, classroom environment experiments in the *Journal of Educational Psychology*.[9] Kephardt patterned his experiments upon Harmon's "eye-opening" Texas experiments, and his recent experimental results agree with Harmon's earlier results.

Conclusion

Hanna said recently for the benefit of today's thoughtful educators that, while we hold firmly to new discoveries in teaching and learning methods of the past 30 years, we must move forward to agreement on that content of education essential for true progress.[10] Likewise, while we hold firmly to new discoveries in design method, we must move forward to agreement on that content of school design essential for true progress. To continue to design school buildings without a clearly stated, objective, public explanation of what a school design is and does educationally, from the point of view of both subject matter and the child, deliberately invites public criticism of school architecture and encourages intervention.

On the functional side of school design today, a clear understanding and objective statement of contemporary school design function has become possible within recent years. The pioneer work necessary to complete the basis of a new and vigorous school architecture now patiently awaits those persons adequately sincere, interested, and qualified to perform it.

Total function determines total form. Just as surely as the dimensions of physical space determine the reality of a school building, we need a more functional contemporary school design program based on more fundamental scientific concepts. As Mather at Harvard University stated recently: "The fundamental concepts of even the most complicated of modern sciences can be comprehended by almost everybody. That, indeed, is one of the earmarks of a fundamental concept; it explains what appears to be complex and chaotic in terms of relationships that give significance and meaning."[11]

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8 Harmon, D. B., "Lighting and Child Development," *Illuminating Engineering* 40:199-233, April, 1945.

9 Kephardt, N. C., and Floyd, W., "Classroom Environment and Pupil Welfare," *Journal of Educational Psychology* 45:52-59, January, 1954.

10 Hanna, *op. cit.*, pp. 273-275.

11 Mather, K. F., "The Scientist's Responsibility for the Interpretation of Concepts to Laymen," *Science* 119:299, 300, March 5, 1954.

PLANNING SCHOOL FACILITIES

Paul W. Seagers

Until rather recently, practically all of the functions related to planning a school building were performed by the architect. The superintendent, trustee, or board of education informed him of the capacity of the building and the probable location. From there on the school authorities went through the motions of approving plans and signing contracts as recommended by the architect. The fact that most of the school buildings served their time very well attests to the competency of their designers. We must admit, however, that the school program of the past was quite simple and did adapt itself to the existing standardization of classrooms. For many years a classroom unit was considered to be 22′ x 30′ except where lockers were provided in the rear of the room, then 22′ x 32′ became the unit. Frequently, architects have mentioned that they used to design the outside of the building first and then cut it up into the units and fractions or multiples of units to make the rooms.

The school program of today is quite different from that which existed years ago. High school was primarily preparatory for college, and only a small percentage of boys and girls of high school age ever attended high school. It was selective, and the courses of study were limited. Now we find all the children of all the people going to school. Graduation from high school is the rule rather than the exception. Schools has become comprehensive in fact. They must not only provide a great variety of courses but must also be able to meet a great variety of individual needs. To meet these needs, it is necessary to use a new method of planning—planning from the "inside out." To do this, more skills are required in the planning process, and a more fundamental point of reference must be established.

First, we must realize that the whole child goes to school. He goes to school as a total functioning organism, socially, emotionally, physically, and mentally. All of these facets of the child are interdependent and intercorrelated. It is quite impossible to be happy in the mind only. Happiness is reflected throughout the human organism and, in fact, may be caused by some pleasurable sensation or social acceptance or by some purely imaginary experience. Emotions permeate the whole body and condition the activity of every portion of the body. People can become blind with anger and even

paralyzed with fear. So we find that human beings act as total functioning organisms, and their acts are conditioned by a great number of factors, such as what they eat, what they wear, the environment they are in, their social contacts, and their general physical and mental health.

School facility planning involves the planning of that part of the educational environment developed and/or utilized under the direction of the duly elected or appointed school officials. There are three important aspects to this educational environment: the physical impact of the environment upon the human being, the psychological impact of the environment, and the educational arrangement of the environment. They are definitely interrelated and very difficult, if not impossible, to isolate completely. However, an attempt is made here to treat them separately in order to simplify the problem as much as possible.

The physical impact is probably the most important aspect of the environment, and it has definitely been given attention longer than any other aspect. Beyond a more or less refined stage of protection from the elements, the physical impact has been given little attention, primarily because the human being has been thought of as very adaptable to his environment. In fact, a living organism has had only three choices through the ages: it must adapt to its environment, change its environment, or die. Man has survived for so many centuries because he has been very adaptable and sufficiently ingenious to make changes in his environment. Adaptation is always energy-consuming. When more body energy is consumed in adaptation, less body energy is left for making changes in environment or purposeful living. Fortunately man has been able to adapt himself to his environment and has had enough energy left over to make gradual changes in his environment. These changes have released more energy for further changes until he now can surround himself at almost any time with the thermal, visual, and acoustical conditions he desires. The technical "know-how" is available, but unfortunately the application of this knowledge is woefully lacking.

Most of our knowledge of the world outside of our bodies is obtained through our eyes. With considerable effort or "straining" man can see under very adverse or trying conditions of glare and improper lighting. Yet, when he is doing this, he is using body energy which could be better used for body repair or purposeful living.

Man can also adapt himself to very poor acoustical environment. In rooms having bad sound reverberations, you have seen

people sit up straight, cup their hands to their ears, and "strain" to hear. Besides being annoying, this whole act is requiring excessive body energy just for hearing.

Man frequently has to adapt himself to his thermal environment. He may shiver to stimulate the circulation of the blood in certain parts of his body subjected to the cold. He may perspire excessively when his environment is too warm. Either of these two acts not only is distracting but also requires body energy.

Even the furniture can require excessive use of body energy for adaptation. A chair that is too high, too low, or in some other way uncomfortable, causes certain muscles to become taut and the individual has to make an effort to adjust to a position giving some degree of comfort. If he persists in the use of that type of furniture, then the body makes more permanent adjustments so as to require less effort for adaptation. These more permanent adjustments become deformities.

The psychological impact of the environment upon man is more difficult to analyze, since the emotional status of the individual has much to do with this psychological impact. The emotional status can change rapidly because of ideas, fancies, rejections, words, tones, body chemistry, and many other things. These are things that the school building planner can not control, so he must be content with the things he can control.

Color is definitely a part of the psychological environment. Color as well as the total environment can be considered stimulating, relaxing, neutral, or depressing. We are not interested in designing a depressing environment, but we should be interested in the other three. Without a doubt, adjustment of an emotional or psychological nature also requires excessive body energy.

We see that adjustment to both the physical and the psychological aspects of our environment normally require considerable bodily energy. Harmon has made studies which indicate that the use of body energy for adaptation in what is usually considered a good classroom actually deprived human bodies of the requisite amount of energy needed for body repair. Further research may prove even more astounding, however logical. Regardless of the degree of body depletion accepted as a fact, research demonstrates (1) that adaptation to one's environment requires body energy, and (2) that energy might better be used for purposeful living, for a vocation, for recreation, or for study. Let it not be said that the author advocates an environment requiring no human adaptation.

Some adaptation, adjustment, or accommodation is desirable to keep the body adaptable; however, this does not have to be in the schoolhouse. Generally speaking, *the environment which requires a minimum of body energy for mere adaptation and thereby releases a maximum amount of energy for purposeful learning is the best educational environment.* The proper planning of any educational facility must, perforce, use this principle.

The need for educational arrangement or functional planning of the school plant is now an established fact. Various types of activities and school programs require various sizes and types of space. There is no such thing as a standard classroom today. Classrooms—commonly thought of as educational areas with a ceiling, a floor, and four walls—must of necessity vary in size. They must be planned for specific uses and must at the same time, be designed to be adaptable to other uses if need be. These areas not only must vary in size but must also vary in relationship one to another, to meet the particular needs of the community and their resultant effects on the school program. One school may require a cafeteria while another may not. One school may become the center of community recreation while another may not. One community may require agriculture with an extensive evening program while another is more urban. Good school facility planning will take into account all the local needs and yet provide flexibility.

Modern school facility planning must give consideration to the following aspects:

1. The whole child goes to school. He goes to school socially, emotionally, physically, and mentally.

2. The environment must require the expenditure of a minimum of bodily energy for mere adaptation.

3. The educational spaces must be functional both in size and in relation one to another, yet be adaptable to change.

These three principles should be the basis of all school building planning.

Discussion

MR. STOCK: Isn't it true that most of the time cooling is necessary in the classroom?

MR. WINKELHAKE: You are very right, Mr. Stock. Some of you probably remember the excellent study done in the Moline, Illinois, school, under the auspices of Mr. Stock and the Herman Eltz Division, and reported in *Architectural Forum*. The results of this study of heat versus cooling during the course of the school day showed that the need was predominately in the direction of cooling.

MR. BANKS: Are they now air conditioning public school buildings with mechanical refrigeration to cool them just like we heat them? Dr. Seagers talked about two schools in Germany that had mechanical ventilation. I didn't think, however, that you meant the refrigeration type.

MR. SEAGERS: No, I meant mechanical ventilation.

MR. BANKS: Well, I don't know anything about the South. How would you go to school in Florida, for example, without some type of cooling? Or how about Mississippi?

MR. MURPHY: We are pretty lucky to get school buildings there, even without air conditioning.

QUESTION: About four years ago, Texas A. and M. studied the effects of air movement and I haven't heard the results. Could you inform us.

MR. WINKELHAKE: I believe that the results of that study were published in graphical form, showing the cross sections of air movement in relation to different types of openings, ventilator sashes, etc. The objection that I would raise in connection with that study is the absence of children and furniture in the room, factors that would probably change the pattern. I myself am inclined to feel that the human element should be included in such studies.

QUESTION: How do the Germans pay for the types of buildings shown by Professor Seagers?

MR. SEAGERS: I am always asked that question when I show these slides. In the first place, the German people are not afraid of taxing themselves, and they are very willing to put a large share of the total national income into education. In many ways, I think they value education even more than we do. Furthermore, to stimulate some of this construction, counterpart funds were used. Now

what are counterpart funds? Actually we levy a tax over there for occupation—occupation of their country. Part of that money has been set aside and put into what is known as counterpart funds in German marks. We use part of these funds, which were originally German, to stimulate school construction where it is lagging. Many fine vocational schools have been started in this way. We say, "If you want to build a good school here, we will take 20 per cent, or 15 per cent, or whatever per cent is necessary out of counterpart funds and you raise the rest of the money and build the school." I was put back on my haunches by an interpreter in Kiel when being shown the beautiful buildings built partially with McCloy funds or counterpart funds, and I very foolishly said "Well, that's the way I like to see our money used. We have probably spent some money over here foolishly but this is a nice school and I like to see our money used this way." And this woman really slapped me down. She said "What are you talking about—your money. That's our money." Of course I didn't bother to argue with her because, in the first place, if we hadn't used the money for those purposes, we would have had to raise more money here for occupational costs, so it actually is our money in the long run. That's one of the methods we have used, and we have put the other occupation forces to shame in many respects by using this method to build up the German educational system.

Those buildings are costing about what our school buildings are costing in terms of their purchasing power. Because of low labor costs and high material costs, they can custom-build buildings cheaper than we can. In my report to the German authorities I criticized them for not having thought through the utilization of space. They are wasteful of space in terms of our program. But I didn't want to judge them in terms of our program. No person should ever go into any country and judge that country according to our standards. We must know their philosophy, we must know their background, what they are attempting to do, and then judge them according to that. I tried to get them to think through their program and develop some standards of their own rather than merely copy those of Switzerland, Sweden, France, England, or the United States.

QUESTION: Are we architects sometimes misled by such things as rose-colored windows in an endeavor to do something different? Do we grasp at these stunts because "somebody else did it" and fail to take the trouble to find out whether it is satisfactory or not? How far should we go in spending pocket money to carry out dreams of our own that way?

MR. WINKELHAKE: This would depend upon one's own professional design and integrity. We have good and bad architects, good and bad designers, good and bad educators. Contemporary scientific knowledge is available concerning brightly colored panes of glass which shows that ultra-color temperatures materially affect the way that we locate things in space, the way in which we discriminate detail, the way we perceive form. This is especially important in the primary grades, where we go from the concrete to the abstract. We use concrete objects to develop abstraction and abstract symbols, and the manipulation of these abstract symbols depends upon the accuracy, the precision, and the sense of understanding that is gained at the time of that experience. So, to use brightly colored panes of glass might be very nice, might be perfectly justifiable I would say, provided the designer is also aware of the long-term effect upon the youngsters and the teaching situation.

MR. SEAGERS: I would like to add something to that. You know an architect has to be a pretty wonderful man when you come right down to it. Think of all of the jobs that he has to do. He has to know structure, stress, strain, soil for foundations, lighting, and design. He has to be an artist, a practical business man, and one of those magicians, too. I don't know of any profession that requires a greater knowledge than architecture. I want to congratulate the architects on the job they have been doing over a period of years. But sometimes they are forced to make decisions, such as the one you are talking about.

I have a whole list of buildings and plans of buildings in my office which we used in my classes last spring and which were published in the various journals in the last five years as outstanding schools. We can really take those things apart educationally. Architects are being forced by some gadget, some particular whim, or some new material to include certain things in their plans that they do not approve. It takes a whale of an ethical architect to come out and say, "Now look here, that is not good. I will not lend my name to anything like that." After all, the economic pressure is there. There are some architects in this room who would do that, and I count them among my close friends. I want to congratulate these people.

QUESTION: Is it desirable to set aside a certain percentage of the building costs for art in a school?

MR. MAURER: Well, I would like to answer in round numbers. Anything that you do that is curved, costs four times as much as when it is square, whether it is a building, a stairway, a corridor, or

a cupboard. I would like to ask you as a school board member, is your school board willing to allow you 2 per cent of your proposed school budget for decoration? If you propose spending a half million dollars, that would amount to $10,000. Can you go to the taxpayers, present them the bill, and say, "That is a part of our educational environment that we think is necessary"? We are going to hear about steel buildings for ridiculously low prices this afternoon. Obviously they are not going to have round stairways. That puts the architect squarely in the middle.

MR. SEAGERS: Because German labor is much cheaper than ours, architects there design their own lighting fixtures. You can get anything that you want. The forms for spiral and ornamental stairways are expensive in this country, but they are not so expensive in Germany because they actually require less material. They are more closely designed but not over-designed in style. We have an entirely different situation over here. Believe it or not, asphalt tile is one of the expensive materials for floors in Germany and wood is one of the cheaper ones. You can't advise people in a foreign country very well unless you have a pretty good knowledge of their economics, of their industry, and of the materials available. While asphalt tile is cheap here, wood is cheap in Germany. Compared with foreign countries, we haven't done much with prestressed concrete in this country.

MR. BANKS: I again want to thank Dr. Seagers and Dr. Winkelhake for their contributions this morning. I want to thank the audience, too, for its attention, and for participating in the discussion. I don't have authority on the part of the dean to say this, but I think that if you remember all that you learned yesterday and today and are still going to learn this afternoon, you should get some kind of a degree in either architecture or education or maybe both. We certainly have been awakened to the facts from hearing both the professional side and the architect's side of this problem. I want to add my tribute to the architects, just as Dr. Seagers did, and to challenge them to keep right on thinking and to help the educators keep pace with what is the most desirable building, at least for the day in which we live.

MAXIMLITE LOOKS AT THE PLANNING OF SCHOOL BUILDINGS FOR THE WHOLE CHILD NOW

Ralph Fanning

It is important that at the outset you understand that the Maximlite school organization does not manufacture nor build school buildings. Instead, the Maximlite program for school design represents a system of planning which has been developed through many years of research and study, under the guidance of T. Ewing Shelton, architect of Fayetteville, Arkansas. Mr. Shelton regrets that he is unable to be present to personally present the objectives, the research, and the experiences which have led to the development of the program as we know it today.

Before I go into a discussion of what Maximlite has done for school building, and what it can do for you, I feel it is necessary that certain explanations in line with the purposes of this conference be made.

So far in this conference there has been developed a well-rounded exposition of the functional approach to school planning. Those of us who have been privileged to operate in the Maximlite program recognize the necessity for the planning of school buildings so as to fit most nearly the functional requirements insofar as modern educational methods are concerned. Certainly we must consider not only the necessity for functional planning in the arrangement of the school plant as it relates to the various educational, administrative, health, and recreational functions, and the many other relationships which have become so important to the modern educational processes, but we must also give adequate consideration to the shape, arrangement, and physical characteristics of each space as it relates to the needs, health, and full development of the individual child.

We can all agree that the most important consideration in the entire process of our planning is contained in the title to this conference, which has been so aptly expressed as "Planning School Design for the Whole Child." May I emphasize that I believe that America's future, and the most important business of this generation, or for that matter of any generation, is the proper training and character development of our children. One thing which we must not lose sight of is the importance of each individual child and our need to consider his interest in all our thinking and planning.

We must recognize that the more urgent need at this hour is to provide adequate school facilities now, for *today's child,* and we must not let our future requirements nor our desire to develop better functional facilities prevent or retard the building of the minimum required school buildings to keep pace with our growing needs.

We know that each individual child passes through the various stages of his educational experiences only once, and if he is denied proper facilities at the time when he needs them, his opportunity has been irretrievably lost. Therefore, in choosing a topic for this discussion, we have added the word "now" to the basic theme of this conference.

We feel that the economies inherent in the Maximlite school planning program can enable those of you who are directly concerned with the providing of adequate educational buildings for your various school districts, to obtain more complete and better functional design within the limitations of your finance.

In order to understand this better, let us consider the seriousness and magnitude of the over-all problem. Two years ago a national organization made a comprehensive survey of America's school housing needs. This revealed that through 1960 America should provide a minimum of 600,000 additional classrooms if we are to keep pace with our needs. This is a staggering requirement, especially when we consider that for the past two years we added only some 50,000 new classrooms each year, and this year we will probably do about the same. This means that between now and 1960 we must expand our school building activity to approximately 100,000 new classrooms each year if we are to stay abreast of the minimum requirements for housing our oncoming school population; and we must do considerably better than this if we are to alleviate the overcrowding and, to use the expression of one school board member during a recent conference are to, "prevent our children from hanging out of the windows."

Last year, one of our national reporting services told us that the average cost of school classrooms in the United States was approximately $44,000 a classroom. Although this is not a true average which we can use for our analysis purposes, since it includes educational buildings of all types, it would probably be reasonable to assume that, after we have taken the specialized educational buildings out of the total cost, we would still be confronted with an average cost of approximately $30,000 a classroom.

A little simple arithmetic will reveal that, if we allow these costs to continue, our country will be confronted with the necessity of

adding thirty billion dollars to our already over-burdened tax structure, for new construction in each of the next six years. If we bring this over-all picture down to the level of each individual school district, it represents in many cases an almost unsurmountable problem, and, unless adequate steps for correcting the situation can be found, it can mean a serious breakdown in the entire educational process, which is the very core of the American way.

I do not need to remind you, who are directly concerned with this problem, of the difficulties which you are encountering, and I compliment you and your great state in the forward strides it has taken in setting up the school corporation technique for financing.

It will permit you to go ahead with school construction, although it has not in any sense changed the fact that the school construction must still be paid for from increased taxes at a time when all our people are already too heavily tax burdened. Because of this, we must be constantly aware of the need for economy.

We, in the Maximlite program, know that it is possible to build better schools for less money, and I am sure that America will come to know the debt of gratitude it owes to Mr. Shelton and his associates for their tremendous accomplishments in this time of need.

I am sure you can understand why I am moved to make such a statement by the consideration of the following facts:

Building under the Maximlite program has been under way in the states of Missouri, Arkansas, Kansas, and Oklahoma during the past three and one-half years. During that time some 25 elementary and high schools have been designed and constructed under the guidance of the Maximlite Associated Architects and Engineers.

The total volume of school construction represented here involved more than 440,000 square feet of school facilities. The actual average cost on the over-all program is computed at $6.39 a square foot. This cost is for complete schools, including all facilities except furnishings, and excluding the cost of land and professional fees. Some amount of site improvement has been included. Many of the schools included gymnasiums of rather elaborate dimensions and, where gymnasiums were omitted, particularly in elementary school buildings, sizable general purpose rooms were included in most cases.

The lowest cost a square foot included in the $6.39 average previously mentioned, was a 16-classroom school for the Branson School District, Route 4, Branson, Missouri, which was constructed at an average cost of $5.46 a square foot. The building included a 40-foot by 60-foot gymnateria with stage, and four of the classrooms

were self-contained. Four central toilets were included, and an office, supply storage, a janitor's room, two general storage areas, a kitchen and food storage area, a teacher's lounge, and a health room were also provided. This particular school was a two-level, due to the terrain, whereas most Maximlite schools have been of the single floor plan type. The school capacity, based on 30 pupils a classroom, was 480 pupils, and the cost was $288.27 a pupil. The cost of the entire building volume was 45 cents a cubic foot.

Of the 25 schools represented in this average, seven were built at a cost below $6.00 a square foot, 11 were built at a cost between $6.00 and $7.00 a square foot, and the remainder were built at a cost between $7.00 and $7.39 a square foot, except one six-classroom school and full-sized gymnasium, built at Green Forest, Arkansas, at a cost of $8.79, and a three-classroom school at Paragould, Arkansas, at a cost of $7.59.

One of the most recent Maximlite schools was awarded on April 14th of this year at House Springs, Missouri, and is significant because it is being built in a suburban community of St. Louis, where labor rates are under rigid union jurisdiction and labor costs approximate the rates for most areas in Indiana. This House Springs school includes 15 classrooms, a home economics room, a science laboratory, a study hall, a library, complete office facilities, a faculty conference area, a vault, a clinic, a teacher's work room for both men and women, dark storage and light storage rooms for the science laboratories, a 1,000-bleacher-seat gymnasium and stage with complete facilities for girls' and boys' lockers and showers, a music practice room and music office, instrument and uniform storage areas, and an industrial arts shop 33 feet by 70 feet located in a separate building. In all, the project represented 45,200 square feet of floor area and the total construction cost, including heating, ventilating, electrical work, and plumbing, was $331,984.75, or a unit cost of $7.34 a square foot.

In the over-all program, the average cost per classroom so far has been $12,000. This ranged from a low of $5,812 per classroom for a 10-classroom elementary school with a gymnasium and general purpose room, built at Morrow, Arkansas, in 1952, to a high of $23,200 for a six-classroom high school built at Wrightsville, Arkansas. The comparatively high cost on this building is explained by the fact that the average classroom cost includes a large gymnasium with a stage and dressing rooms and locker and shower facilities for both boys and girls, which contributed a major proportion of the total cost.

From the foregoing figures I think we can assume that Maximlite has demonstrated that economy in school construction can be achieved. Many of the results are so astounding as to be almost completely unbelievable, and we expect and invite you to challenge them. We also know, however, that the challenge represented to you by your school needs will compel you to investigate the Maximlite program to determine whether or not the system of design developed by the Maximlite organization can deliver, for you, adequate school facilities at a cost within the financial ability of your school district.

This will be increasingly apparent when you realize (1) that Maximlite schools are built of conventional materials such as brick, stone, reinforced concrete, steel, and glass block, with asphalt tile floors, acoustical ceilings, hardwood gymnasium floors, 20-year bonded roof, and a full complement of materials which are available and in use in your school district, and (2) that the construction methods are similar to the ones used for conventional buildings.

The Maximlite designed school is in no sense a prefabricated or standard stock building. The Maximlite organization of Associated Architects and Engineers sells no materials and does not engage in the fabrication, erection, or construction of the buildings or of any parts or equipment therefor. Each Maximlite school has been, and will continue to be, individually custom designed by architects and engineers who are familiar with the problems of each locality and are licensed by the state in which the school is built, according to the best traditions and ethics of the architectural profession.

In spite of the unique features of Maximlite design, any contractor who is experienced in school construction can erect Maximlite schools without special knowledge or training. The quality of each individual job will be, as it has been in the past, the primary responsibility of the designer. Better than average results have been assured, however, by the research and experience already available to the Maximlite associates. To this we must add the fact that, as of today, there are 16 architectural and engineering firms associated in the design of the Maximlite schools in Arkansas, Indiana, Kansas, Kentucky, Maryland, Michigan, Missouri, New Jersey, Ohio, Oklahoma, Pennsylvania, Tennessee, and Virginia, and more states are continually being added.

The experience, knowledge, ingenuity, and ability of this group of outstanding designers is, and will continue to be, available under the leadership and guidance of Mr. Shelton and his associates. This opportunity for the exchange of information and experience assures

continued improvement in the quality of Maximlite schools and a further decrease in the relative cost of these buildings.

In spite of the fact that many states have outdated and outmoded building codes, it has been possible to bring Maximlite design under full compliance with the various state codes, in all cases yet recorded, without endangering the basic quality and low cost of the design.

Each of the firms participating in the program is licensed under the Maximlite plan and must meet the high standards of quality and design developed by Mr. Shelton and his original associates. It is with pride that I am able to tell you that the firm of Auferoth and Fanning, whom I have the privilege of representing, has been licensed by the Maximlite schools to design and supervise the construction of school buildings in Indiana, Michigan, and Ohio, and it is our hope that we will be able to help materially in bringing more schools of superior design and lower cost to these great states.

All buildings designed and built have been and will continue to be contracted for on a competitive bid basis. The number of qualified contractors desiring to bid on Maximlite schools has been substantial on each job, and the number has been growing as the program developed.

Now a word as to why and how the Maximlite system of design has produced the results we have discussed. Actually, there is nothing mysterious in the methods which have been used. The basic principles have been the elimination of waste and the refinement and the simplification of construction technique. This includes the unique design of the pentagonal Maximlite classroom, built within a hexagonal perimeter, which has helped produce the remarkable economies of cost without in any way lessening the quality of the structures.

Many of the principles used by industrial engineers, and technically described as time and motion study, and methods engineering which has contributed so much to America's ability to produce the complex products of our industry with such fine quality and low cost, have been applied in the development of the design for Maximlite schools.

I must again stress that the constant objective has been, and will continue to be, improvement in functional layout in the classroom, including better natural lighting and a closer integration of the functional centers, with a reduction in communication area.

The buildings feature, among other things, reinforced concrete foundations; brick, stone, and glass block exterior walls; sound

absorbing lightweight block interior walls; aluminum, stainless steel, or galvanized steel; and glass block window vents, with Solex glass used where finances permit and conditions require it. Filtered perimeter warm-air heating and fresh-air ventilation, during both the heating season and the warmer months, under adequate automatic thermostatic control has been included.

Steel framing has been used since the inception of the design, and roof construction can be optionally designed in wood or incombustible construction. All roofing has been 20-year bonded roof.

Interior treatments include ceramic tile or terrazo-faced block wainscoting in corridors and toilet rooms. Steel door bucks and best quality hardwood veneer doors are used throughout. Best quality chalkboard and cork or magnetic steel bulletin boards have been supplied as a part of the building cost.

Acoustical ceiling in all corridors and in functional rooms requiring them have been included. Other ceilings have been of various materials including acoustical treatment, fibre tile, and plaster. The acoustics of the Maximlite classroom have been outstanding, primarily because of the basic design, even when acoustical ceiling treatment has been omitted.

Most of the schools so far constructed have been asphalt tile floors and either asphalt tile or rubber base. Gymnasiums have been full sized, using either laminated wood arches or rigid steel framing. Gymnasium floors have been of best quality maple and either permanent or folding bleachers have been provided.

From the foregoing description I am sure you can see that quality materials have been used and that great variety and flexibility in architectural treatment is possible. Now a word about what you can expect in the way of cost for Maximlite schools in *your* district. I am sure you recognize that the availability of material in each locality, the existing labor rates, and the building code requirements will vary in each state and often in each local community.

According to our best estimates, schools can be built in Indiana at a cost of from $8.00 a square foot to something in the neighborhood of $11.00 a square foot except in those areas where class I, four-hour fireproof construction is required. There, of course, the cost may go somewhat higher, but the same basic economy of design will keep the relative cost low. This is in comparison to the average cost of school buildings of $16.50 a square foot in Indiana which, according to our information, is the current figure, and of $15.00 and up in the neighboring state of Ohio, where the average is probably considerably higher than in Indiana.

In summation, I would like to suggest that the Maximlite program represents an opportunity to improve the quality of school design at a cost savings of from 20 to 40 per cent of the average conventional design cost. I would like to present to you Mr. James Matthews, of the architectural firm of Bissman and Matthews, of Springfield, Missouri, who has been associated with the Maximlite program almost from its inception, and who has been responsible for the design and construction of a large number of Maximlite schools. He will give you a few of the basic principles with which the Maximlite Associated Architects and Engineers have achieved the results which I have disclosed.

BASIC DESIGN PRINCIPLES OF THE MAXIMLITE SCHOOL

James W. Matthews

The design of the Maximlite school has been conceived around three essential requirements of planning. First, the school must have more and better quality of natural light. Second, it must have better ventilation; and third, it must have better acoustics. Other desirable features to be considered are the following:

1. The building must be educationally functional.
2. The size of rooms must be more in scale with the pupils.
3. Each material must perform a strategic function.
4. Long corridors and outside blank walls must be eliminated.
5. The building must be designed around standardization, as this would ultimately result in economy.
6. Due thought must be given to the cost of schools, as economy is uppermost in the requirements of most educators.

Maximlite is derived from the words "maximum light." Additional light is provided by two outer walls which are constructed of prismatic glass blocks starting three feet from the floor and going up. Light striking these walls is diffused into the room and concentrated, due to the shape of the room, in the darkest corner of the classroom. Thanks to the bent exterior wall and placement of seats, all light is reflected over the left shoulders of the students. Flat glass in windows of conventional classrooms is not given a chance to be of full benefit for, as the sun rises to give us the light we require, the teacher or pupil pulls down the blinds to avoid excessive heat and glare, "making the entire situation silly."

Apparently the idea of a classroom having to be rectangular dates back to the log cabin days when it was easier to build in that shape. The old classrooms had to be narrow enough for the far side to be lighted from windows, and, in turn, these windows had to be set high, so that the sun's rays would strike at such an angle that light would be carried across the room. Naturally, this made high 12-foot ceilings a necessity and affected the seating arrangement as well.

In the Maximlite classroom, the seating is more compact; the light is equally distributed; and the acoustics is tremendously improved. Ceilings have been lowered to approximately 10 feet, more in scale with the children. Haydite blocks are used in construction

for all interior walls with either acoustical tile or plaster for the ceilings, and the teacher finds that no vocal chords need be strained.

The Maximlite classroom also affects natural ventilation for, where prevailing winds parallel the outside wall of conventional classrooms, there is no natural ventilation, but, where the room is pentagonal, as is the Maximlite, the wind direction does not matter because there is always cross ventilation. In addition, the glass block ventilator sash can drop 180 degrees, which allows the air to drop to the floor area where it is needed most.

While any type of heating system may be incorporated in the Maximlite school, it has been found that perimeter type forced warm air is best and most economical. Each classroom has its own heating unit which can be fired with either natural or propane gas or fuel oil. The unit is located on the outside wall below the windows and at the rear of the room. Fresh outside air brought in from the exterior is mixed with the circulated air of the classroom and the warm air is dispersed out to the classroom, by means of "Shelvaduct." All air, both fresh and circulated, is filtered to remove all impurities and chalkdust. Shelvaduct is a combination bookshelf and heat duct which extends along the outside walls of the classroom. It comes factory finished and can be easily assembled along the wall and to the heating unit at the rear of the room. All heat is moved under pressure around the entire outside wall, thereby providing a blanket of warm air against the coldest source. This also eliminates any possibility of condensation on glass blocks or window ventilators. The method by which all warm air is dispersed is similar to the action of a defroster in an automobile. All excess air passes into the corridor through door grilles and is exhausted mechanically. Each teacher can temper the air in his or her room by means of individual room thermostats. Summer control operation is provided by means of a switch which can be operated by the teacher, for starting the blower of each unit, bringing in 100 per cent outside fresh air, and circulating the room air of each room for summer ventilation. This method of heating requires no expensive central boiler room or pipe tunnels. All fuel lines are laid around the perimeter of the building, thereby eliminating all chances of inside leaks. Since each room has its own heating unit, there is no particular concern regarding the addition of future classrooms. Too, a breakdown does not result in the complete dismissal of school, as so frequently is the case with a central type heating system. If one unit breaks down, only one room has been affected.

The Maximlite rooms represent one sixth of a circle and six such rooms thereby comprise a circle, the space within a circle having less wasted area than the space within a rectangle. Long drafty corridors and blank walls at the ends of long corridors are eliminated. As might be expected, these buildings are not rectangles. Some schools look like clover leaves and others like tinker toy projects—it all depends on the number of classrooms they contain. The rooms are arranged in such a way as to eliminate almost all cross-traffic of students. The classrooms themselves, contrary to popular belief, allow for decidedly more flexibility in both pupil and teacher seating arrangement combinations. Each cluster of five-sided rooms, with its own entrance, can be grouped by grades. Clusters of additional rooms can be added at will in the future.

All flimflam is discarded. Why should parents pay for Cadillac type school buildings when most of them can not afford anything more expensive than Fords and Chevrolets in the garages at home? Eliminated from Maximlite schools are such items as ornamentation, attic space, parapet walls, basements, and central heating systems. Window blinds and costly millwork are replaced with precut finished trim and painted lightweight block. The construction of outer walls is standardized so that the same foundation and wall forms can be used over and over. The school can be erected by any good contractor without use of special equipment or highly-specialized, competitive mechanics. The construction operations dovetail, and it does not become necessary to employ floaters.

In conclusion, the Maximlite school has been conceived to meet the ever-growing demand of school administrators for a more functional school plant with more uniform quality natural light, better winter air conditioning and summer ventilation, better sound control, and classrooms with a more healthful and cheerful atmosphere—a design that is flexible enough to meet the requirements of the most discriminating but still within reach of the limited building budget.

LOW COST SCHOOL BUILDINGS WITH PREFABRICATED STEEL UNITS

L. S. Shealy

Introduction

With your permission I would like to take a few minutes to review the part our firm has played in making low cost schools available through prefabricated steel buildings throughout the country.

Admittedly, the use of prefabricated buildings for schools has been a somewhat controversial subject in some quarters. We sincerely feel that this has in many instances resulted from a lack of recognition of some of the limitations in these buildings. There have, as well, been manufacturers of more "industrial type" buildings who have tried to adapt their building to school purposes, rather unsuccessfully.

At the outset, let me make our position clear by stating that we do not feel that this type of building is the complete answer to the problem, and we full well recognize its limitations. Quite obviously, there are metropolitan areas where consideration of this type of structure would be out of the question.

We would also choose to make one other point quite clear, and that is that our firm is in the manufacture and sale of steel buildings. We are not architects and do not profess to be. We acknowledge the many considerations that must be developed in the design of a complete school plant, and have, as a result, stressed with our school contacts the importance of the architect in taking this "basic shell" and proceeding from that point in design.

While there are other firms manufacturing standardized buildings which have been used for schools, we sincerely think that our company has been foremost in working with school officials and architects on more economical schools. For example, for over five years, now, our company has been the only building company exhibiting at the American Association of School Administrators convention.

Possibly the best way to proceed would be to give you a brief résumé of the basic design of the building. We can then see how this design is compatible with current thinking in school construction. Following this we will see a series of slides showing actual installations. I am prepared to give you cost figures and descriptive information as to the type of facilities constructed.

Steelox Design

A steel sheet, 25 by 96 inches and 22-gauge, has no beam or column strength but, by forming it into a Steelox panel, the strength is built into it. It will become a column capable of supporting over 1,000 pounds, or a beam that can carry several hundred pounds. Obviously, these panels develop a very high strength-weight ratio. I have before me a sample of one of these panels that is used as a basic component in our type of building. These panels are 3 inches deep and 16 inches wide. You might observe that, as adjacent wall panels are interlocked and bolted together, you accomplish with two bolts for each panel a complete load-bearing wall. That is, the panel not only functions as an outside covering but also replaces the conventional stud normally required for supporting the roof. This same type of panel is utilized, with the ribs up, for the roof construction of the building. It is also used for ceilings, and partitions.

I believe you will immediately see the flexibility available with such a structure, for it is possible to locate your windows and doors in a multitude of arrangements. This panel facilitates making available a wide range of building sizes, as this material is almost twice as thick as conventional corrugated siding. This means longer life in the structure. The panel also permits an attractive smooth sidewall.

The panels utilized in these buildings are of Armco Zincgrip Paintgrip material. Essentially, this is a quality galvanized sheet, pretreated for painting. Of particular interest is the fact that one of these panels, 12 feet long, is installed in the wall of the building with only two bolts. The panel is easily handled by one man, and the result is 16 square feet of finished wall area in approximately one minute. The speedy erection of this type of construction is the major reason for economy over conventional materials. Most of the work is done at the factory under controlled conditions which permit reduced labor cost at the job site. There have been many two-classroom school units of this type of construction on which the steel building itself was completed in less than two days.

You might note that all fasteners or bolts are on the inside of the building and are not exposed to the weather. Another major benefit in this basic type of construction is the ease of insulation and the resulting comfort of this type of building. Normally, wooden furring strips are nailed to the ribs, with a helix-type drive nail. To this, conventional insulation and inside wall finish are installed.

The resulting buildings are absolutely safe from the standpoint of wind and snow design, as our structures meet American Iron and Steel Institute specifications. Obviously, if noncombustible finishing materials are used, there is little or no fire hazard in the building. Of course, the inside finish of the building, as well as the heating, lighting, plumbing, and inside furnishings, can be the same as in any other type of building.

Design Trends

We do not feel that the use of this basic building unit is inconsistent with much of the thinking today in school building design. It is quite true these buildings would not be considered monumental or impressive structures. Actually, some educators, school planners, and architects feel that in some cases we are putting too much money into our school buildings. This has often been at the expense of getting the proper teaching staff and of flexibility in the structure 20 and 30 years hence. Many architects and school planners have found that more economical school buildings can be attained through the use of mass produced standardized steel building units of the type our firm manufactures.

This point of view has been summarized in an article entitled "Less Costly Schools," by Henry S. Churchill, of Fulmer Associates, Architects, New York City. Quoting from the article:[1]

> Are the high costs of school construction worrying you? They have been worrying us, because as architects we make our living by building buildings, not by talking about programs. For many years we have studied the ways and means of reducing costs in all the various fields of our practice, and in that time certain principles have become evident which may be applied to schools as well as other types of structures. That is, they may be applied if the school board is willing to put aside pre-conceived ideas of Colonial or Georgian "Traditional design," forget monumental masonry, and accept the facts of fundamental materials and use of space.
>
> The first principle to be applied in the reduction of building costs is to try to reduce the amount of labor in the field. The second is to try to reduce the total time of construction. The third is to analyze carefully the basic function of the materials and use only those that best accomplish the work to be performed. This last must, of course, always be balanced against the cost of maintenance.
>
> The usual construction system uses walls, partitions, and roof of either heavy load-bearing masonry or steel, or concrete frames, with masonry curtain wall. The construction is cumbersome and heavy, resting on massive foundations and columns. It is obvious that any system

1 Churchill, Henry S., "Less Costly Schools," *School Executive* 68:42, April, 1949.

> which employs a light skeleton frame with less structural weight would be less costly . . . and *the more nearly self-supporting the structure could be, the greater the economy.*
>
> Such systems [meaning mass-produced standardized building units] can cut at least 20 per cent from customary costs. The building would be permanent, attractive in appearance, contemporary in its architecture, and in scale with its purpose—the education of children.

It seems reasonable that this architect has come face to face with the problems which many school officials have faced. He has acknowledged these from his own professional standpoint. He has obviously reviewed the standardized building units available today, and by using these units, he has found an economical answer to the school problem.

Many authorities, school planners, and architects now believe that, instead of building expensive, monumental schools which become obsolete after a few decades, there is much merit in building less expensive, equally functional structures, with the idea of more frequent replacement and/or possible relocation for population changes.

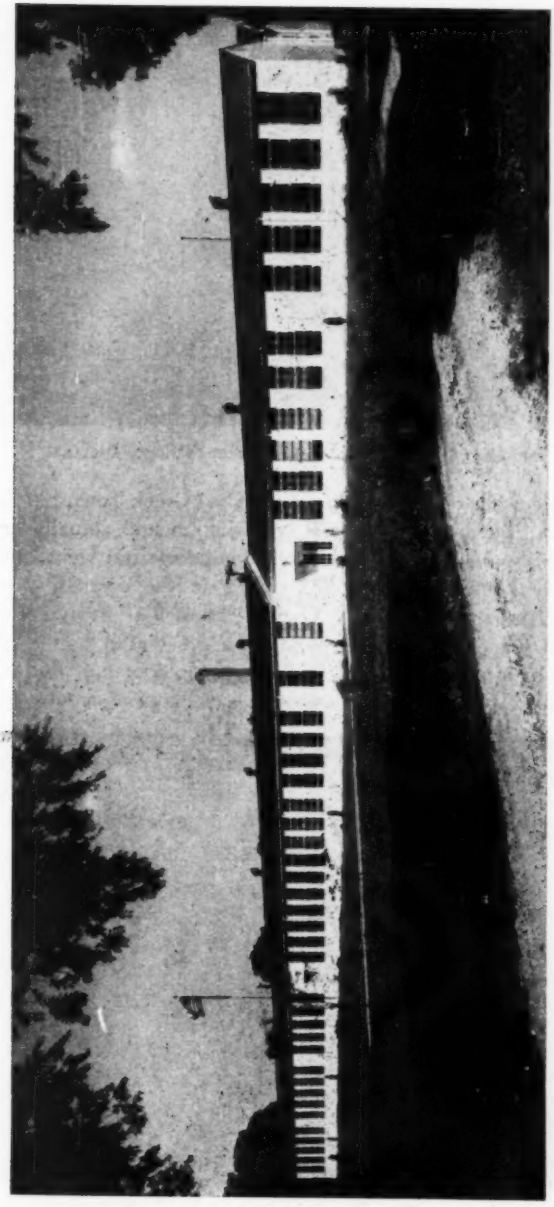
Typical Installations

Let's look at a few typical installations and see how well Steelox construction has served school building requirements. As cost figures are given, let's keep in mind the area, the applicable codes, and other factors which affect cost. The facilities of the Pine Village School, Pine Village, Indiana, include 11 classrooms, two offices, a study hall, a cafeteria, and toilet facilities. The total cost of $150,000 will average slightly under $9.00 a square foot of floor space. While it includes such items as landscaping, it does not include the property and the architect's fees.

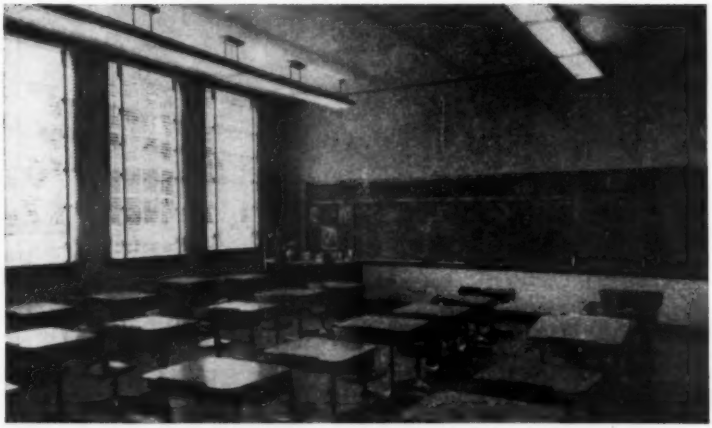
These classrooms are attractive and well-lighted. The wall finish, type of lighting, floor tile, and room equipment were specified by the architect. The standard Steelox ceiling was used, and no acoustical treatment was given the structure. There have been no adverse comments in this respect.

A recent letter received from the principal of this school states:

> The Pine Village School was finished and ready for school in the fall of 1951. I have been here as principal since the opening of the building, and as yet have no criticism of it. The building is fully insulated and we have been very comfortable in all kinds of weather . . .
>
> We have found no deterioration in the metal part of the building, and we would not hesitate to recommend this type of building. The money saved could be better spent on better salaries and for better teachers.



Pine Village School, Pine Village, Indiana



Interior of Pine Village School, Pine Village, Indiana

The sidewalls of the corridor of the Coal Creek Township School, Coal Creek, Indiana, are of steel construction and actually are the load bearing panels of the two Steelox building units separated approximately 12 feet. A dropped ceiling in the corridor provided space for heating duct work. Quoting from *The Swayze Press,* a nearby newspaper: "This steel building, a great asset to the present Symmes Township educational facilities, cost about half the average construction. Conventional classrooms cost approximately $30,000

Coal Creek Township School, Coal Creek, Indiana

a room, while in the Swayze building, the cost is approximately $12,000 to $14,000 a classroom. Total construction costs will be about $114,000."

This first group of illustrations show few of the many permanent, complete school buildings that have been constructed from prefabricated units.

In addition to complete, permanent school buildings, this same type of construction has in many, many cases been used to provide additional classroom facilities at existing school plants. As you know, many schools require one, two, or three additional classrooms to meet emergency needs. The following illustrations show a series of such installations:

The school addition in School Board District No. 3, at Boulder, Colorado, included four classrooms approximately 24 by 40 feet in size, as well as toilet facilities and a teachers' lounge. The following is quoted from an article from the *School Board Journal* for September, 1953:[2]

> School District #3, in Boulder, Colorado, faced the same problem that confronts hundreds of other school systems over the country—how to get more classroom space at the lowest possible cost to taxpayers.
>
> "Lowest possible cost" assumed, of course, that whatever construction was adopted would be modern, efficient, safe, functional, and permanent. Again, as in other communities, Boulder urgently needed the classroom space; so time was an important factor.
>
> The Board of Education surveyed various types of construction cost-wise and otherwise, and agreed steel paneled construction would give them most value for their money.

This structure cost $32,896 or approximately $8,000 a classroom. The secretary of the Board of Education of Boulder, in a letter to another school official, said that, "We are very happy with this type of construction, and we do not feel that an attempt on your part to construct similar buildings would meet with any opposition from the general public. We do not hesitate to recommend to you and your board this type of construction and the Armco Company."

A typical installation in Warrick County, Virginia, erected in 1949, apparently proved quite satisfactory, for during the summer of 1953 approximately 50 classrooms were added in the Norfolk, Virginia, area. While the cost admittedly seems shockingly low, these buildings were completed on one contract for approximately $5,500 a classroom. It should be made clear that in some cases the

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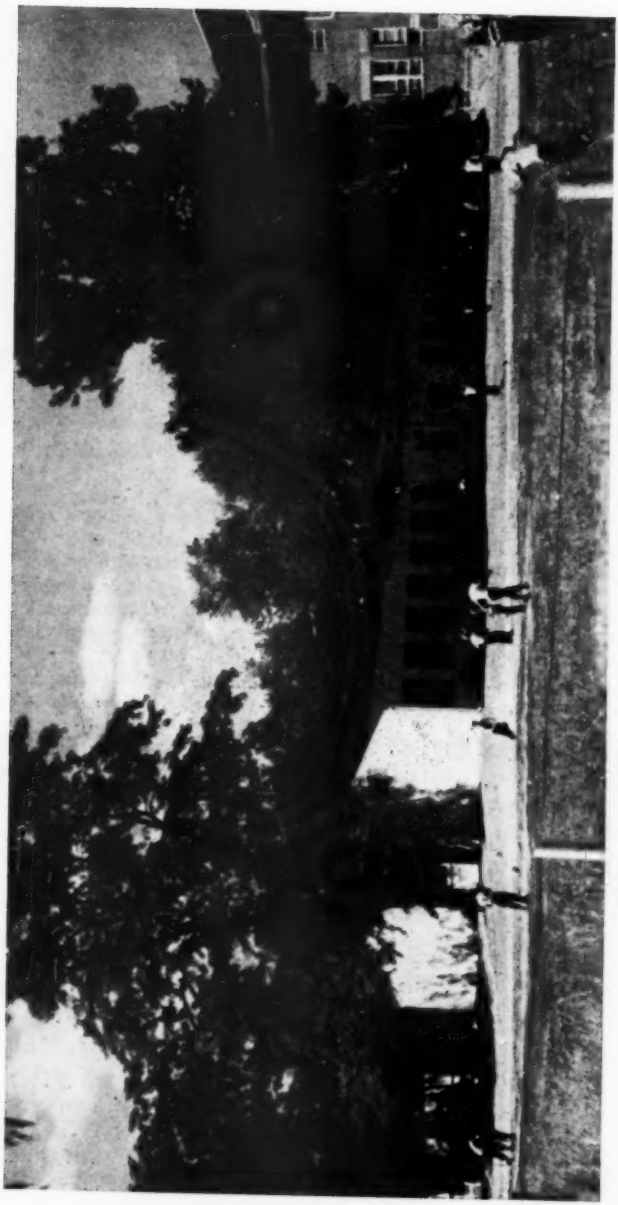
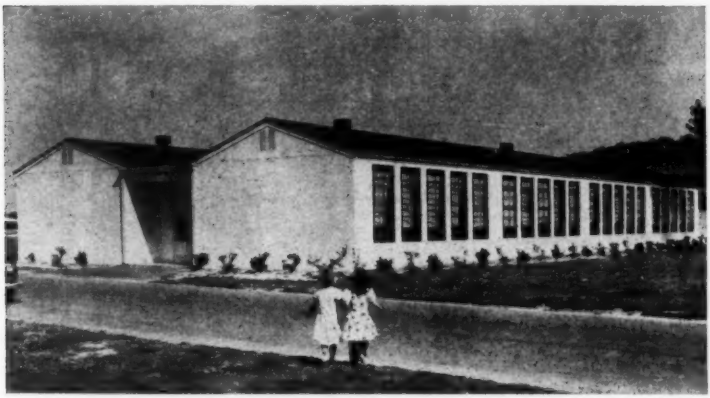
2 Downing, R. J., "How Boulder, Colorado, Stretched Its Building Budget," *American School Board Journal*, 127:102, September, 1953.



Addition to School in School Board District No. 3 at Boulder, Colorado

toilet facilities of the existing school plants were used, and there was no allied space with these additions. The heating plants of the existing schools were increased. The school officials in that area had an extremely difficult time finding an answer to their school requirements because the influx of population in that area, that came with the expansion of our armed services, made their school problem one of shifting population. The ability to salvage and relocate these buildings was a prime consideration.



Addition to a School in Norfolk, Virginia

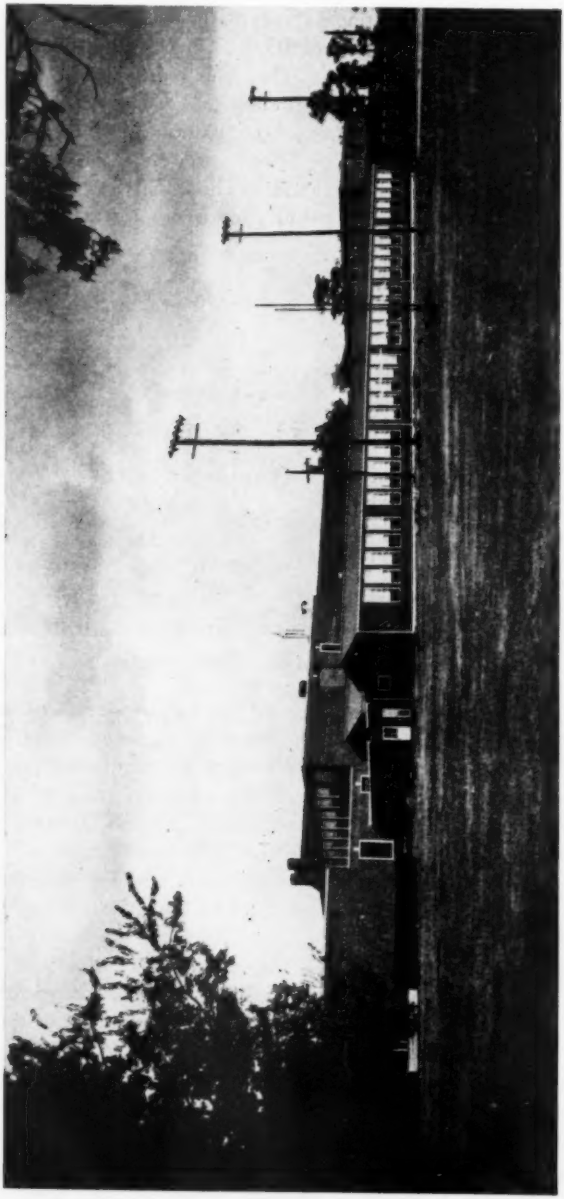
Quite frankly, gentlemen, one of the major prejudices we encounter in discussing steel school buildings is the preconceived notion that such buildings will be very unattractive. Admittedly, most of the illustrations shown so far have been relatively plain in appearance, as, quite frankly, the school board in most instances used practically all its money to provide the facilities required.

We believe this picture of a recreational building shows that a minimum spent on landscaping can help to beautify this type structure.

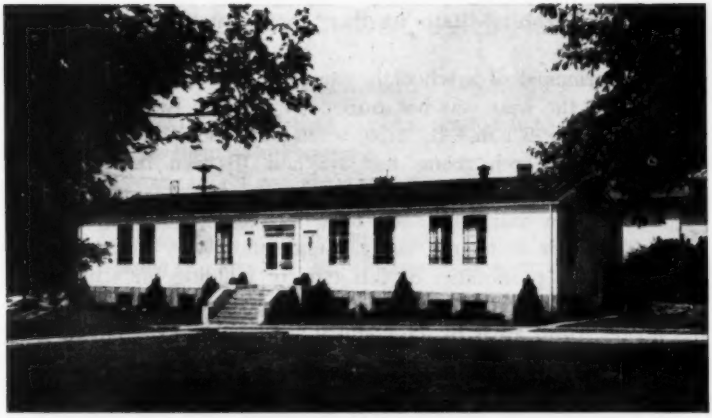
We believe the picture of an airport administrative building in Mayfield, Kentucky, shows rather well the type of fenestration that is possible when the architect has a little in additional funds to apply to the structure.

Gentlemen, I could go on and spend the better part of the day giving you additional details on past installations, but I think you'll find these pictures are representative.

I personally have been in probably a hundred of these buildings, and it quite naturally is pleasing to me to hear some of the



Another Addition to a School in Norfolk, Virginia



A Recreational Building

fine comments that are made by the various teachers, principals, and other school people. One teacher said, "The children like this building much better than the main building. They call it 'their' building. The classrooms are comfortable in that they are well lighted and heated and there are no drafts, as in the main building. My friend and I, when we heard that they were going to build a new portable unit, were afraid we would be assigned to it. Since that time it has developed that we were assigned, and we are now very much pleased."

Two teachers in two of the Steelox buildings in Miamisburg, Ohio, told an AD & MP representative that the children were com-

An Airport Administration Building in Mayfield, Kentucky

fortable during below zero weather, though not all the radiators were in use.

The principal of a school just outside of Toronto, Ontario, reported that the heat was not turned on in their two-room Steelox Building before 8 a.m. By 8:30, when the school day started, the temperature in both rooms had reached 70 even in the coldest weather.

We believe that, after you have seen these buildings and the reaction of their occupants, you can understand why we are enthusiastic over the possibilities of this type of building for school purposes. It is reassuring for us to see the many cases where children in the poorer, rural areas of the country are now in well-lighted, well-heated, comfortable classrooms, where previously they were meeting in hallways and on double shifts.

I want to stress again the fact that some areas can undoubtedly be served better by other types of construction, and we believe that you will find these types of schools are completely functional and completely satisfactory. While the average initial cost will run from $8.00 to $11.00 a square foot, the annual cost on this type building is extremely low. We have buildings of this type of construction that are over 17 years old now and require only an occasional painting. While this type of construction is economical, it should not be considered cheap. Actually, we have seen cases where near-marginal conventionally designed buildings have been below the prices described herein. Predominantly, these have been structures in which they utilized an uninsulated, unfinished concrete block wall with inadequate ceiling construction. Few good designers challenge the fact that this is definitely marginal, as it does not make for a comfortable building or for low heating cost.

In summary, gentlemen, we feel that these steel buildings offer at least a partial answer to the school building problem. It is possible with them to obtain an economical, reasonably attractive structure with inside furnishings equivalent to the finest school buildings. They are permanent and fire resistant.

Discussion

MR. LEGEMAN: I feel that the best approach to this discussion would be in the form of questions.

MR. SEAGERS: I'll ask the first one. You have worked with Armco buildings, haven't you?

MR. LEGEMAN: To some extent, yes.

MR. SEAGERS: What is the difference between the buildings in cost and in type of construction?

MR. LEGEMAN: I will give you a little information that I have accumulated over a period of time. To start with, schools will vary greatly, as you have already heard, by states and by statutes in those states. Indiana has what I consider a good statute on schools. I would like to improve it somewhat, I admit—we all have certain pet ideas. But we have basically a good statute that requires a lot of things that our sister states do not require. In fact, in the state of Illinois there is practically no statute regarding schools—no requirements for mechanical ventilation or any sort of ventilation whatsoever in any part of the building; no statute as to lighting; no statute as to sanitation, or as to the number of sanitary fixtures. There is, however, a statute concerning water supply and wells. Having to comply with such statutes makes a lot of difference when you build for economy.

According to one of the major report services in this country, 12 Indiana schools were awarded building contracts in the first quarter of 1954. I had to eliminate two of them for lack of breakdown information. First, I wanted to see what relation the mechanical work bore to the total contracts awarded. By mechanical work, I mean plumbing, heating, ventilating, and electrical work. I found that in the 10 schools the minimum amount of those items was 25 per cent of the total contracts, the maximum amount was 42 per cent, and the average was 28.8 per cent of the total contracts. I was also interested in the square foot cost in the 10 schools. I found a maximum of $24.23, a minimum of $7.53, and an average of $12.78 a square foot. One of these schools was an Armco school and two were concrete block schools with no exterior veneer and with a timber-decked roof. The remainder of them, I would say, were what most of us today would consider a conventional construction of lightweight block, with a veneer of brick, steel joist roof, and possibly gypsum or a lightweight concrete roof deck.

I was curious to see what our office was doing, so I selected nine schools listed in our office which had awarded contracts of from a minimum of $200,000 to a maximum of $1,000,000 a school during 1953-1954. All of these schools would have to comply with Indiana's statutes, and were located within an area of 300 miles square. One of the schools selected was in the Chicago area; one in the Peoria, Illinois, area (west of Peoria); one in the Indianapolis area; two in southern Illinois; and the others in southern Indiana. I found that the mechanical work (plumbing, heating, and electrical) cost a maximum of 32 per cent, a minimum of 28 per cent, and an average of 30 per cent of the total contract cost, which is just 1.2 per cent off the average of the state. The maximum square foot cost in these nine buildings was $10.70; the minimum was $8.97, and the average was $9.32. These buildings were complete in every respect. I have no apology for what was in them. They were complete even to such items as floor covering, window shades, auditorium seating, home economics equipment, and most fixed equipment.

In comparing them with steel buildings, I used only the five projects which were built in that same period (1953-1954). All of them were one-room and two-room self-contained units. The maximum square foot cost of the steel schools was $10.16, the minimum was $8.66, and the average was $9.20. The average of the plumbing, heating, and electrical contracts for those buildings was 25 per cent of the total construction costs. The percentage of the general construction costs for the mechanical work in the steel frame buildings ranged from a minimum of 43 per cent to a maximum of 61 per cent, with an average of 55 per cent. The remaining 45 per cent was in the foundation, floors, and interior finish. These Armco buildings were typical of those you saw—no gutters, no interior cabinet work, no closets for the classrooms or anything of that sort. I believe that I have taken enough time on these costs unless someone has questions.

COMMENT: We all know that there are marginal type buildings. It is my job to analyze types of construction. Recently I inspected a concrete block building, the type of building which constitutes our primary competition. The price advantage is in favor of the steel, if the concrete block is constructed with brick facing and plastered on the inside. In this particular building, they had not put in sufficient foundations; they had continued caulking the cracks in the walls; and, as the roof construction was the secondary type rather than a bonded roof, they had to refinish it after seven years.

There was also a heating problem, because they did not put insulation on the concrete block wall. Insulation gives you a U factor of possibly .40, contrasted with a U factor of .15 or .20. I am not criticizing any type of construction. But we all know that there are marginally built buildings. We have heard people say, "Concrete block was way under us on this." In analyzing it, we realized that the difference was in the insulation.

MR. LEGEMAN: The prices I quoted on our own work were for the buildings that were not what you would call concrete block buildings. They were lightweight block buildings veneered with brick and stone. They had insulated concrete floors on the earth with asphalt tile for the floor covering; poured gypsum, perlite, or vermiculite type concrete roofs; bonded tar and gravel roofs; steel bar joist construction; one-hour fireproofing throughout all ceilings; full mechanical ventilation and full temperature control throughout; an oil-fired heating installation using type six bunker "C" oil, which requires an underground dual tank installation for a 5,000 gallon reserve capacity in addition to what is used plus the necessary tank heating equipment; and gas-filled tube-type slimline lighting of 30, 35, and 40 footcandle intensity throughout. I could go on at length, but I believe I have described to you basically what I was describing in the way of cost.

QUESTION: For the sake of comparison, what would be the U factor in a brick-faced concrete block wall?

MR. LEGEMAN: You are asking me a point which is a little off the subject. I believe that it would be .24. It has been some years since I personally designed mechanical equipment from the standpoint of heat loss, and some of those things don't stick in my mind. I would say that under Indiana statutes, which we must not neglect, the ventilation requirement in a school of today would be 10 cubic feet a person per minute based on 225 cubic feet (with a minimum of 7½ if you give 100 per cent override). The heat loss from the ventilation will double the heat loss to the walls, ceiling, roof, and everything else in the classroom. Since the ventilation law in Indiana is quite an important factor in the consideration of heat loss, the question of a difference between a .24 and a .20 coefficient would make possibly a difference of 1 per cent in the fuel consumption.

QUESTION: A teacher in Miamisburg, Ohio, states that, in a metal building which has a U factor of .12 and does not have the mass that would be common to this country, a comfortable temperature can be obtained in 30 minutes. A concrete block or a

brick wall is cold, and it takes time to heat it up after it has been allowed to cool over night.

MR. LEGEMAN: In the first place, I do not know whether the Ohio statutes require mechanical ventilation in classrooms. That may be plain heat loss with open window ventilation as far as I know. In the second place, it takes longer to heat the brick wall, but, since the length of heating during the daytime is great compared with the cooling period at night, the wall does not cool down too much. In contrast, the thin metal wall will cool quickly.

COMMENT: That is a control of the U factor in the heat transmission.

MR. LEGEMAN: No.

COMMENT: We don't care about the wall being cold at night, do we?

MR. LEGEMAN: Now, you are talking about two different things. You are talking about the U factor. That is the transmission through the wall and is only constant as long as no temperature differential exists between the inner and outer surfaces. The specific heat of the material is another thing, and is the only thing that is involved in the cooling off or the warming up of the materials. The U factor has nothing to do with the cooling off or warming up. Therefore, the metal will cool quicker and will have to be heated again. The brick wall will cool from the outside and toward the inside, and you will find that the wall on the inside will not cool more than 10 or 12 degrees with the heat off all night, much less than the cooling of the lighter metal. In fact, the mechanical ventilation is about three times the load of all those items. When you have the full mechanical ventilation and recirculation for the warming up period that is permissible under the law, you have a terrific capacity for heating prior to the time that outside air is introduced into the room. You use recirculated air for warming up this brick or metal wall, and the ventilation is turned on later.

COMMENT: Next time you take a walk through the park and see a concrete bench, sit down on it and you will understand a little bit more about what heat absorption is, and what it means to warm up mass concrete.

MR. MAURER: I think this bears a little comment from us. We have been studying the same problem these gentlemen are talking about, and, frankly, we think they are both right. There is an important point, though, about body comfort and heat which deserves attention. I think most of you are familiar with the fact that so-called perimeter heating has been coming very much to the

front. Heating engineers recognize that bodily comfort is the function not only of the temperature of the room that surrounds the body but also of the relative temperature of cold surfaces that may be adjacent to it. In other words we lose heat to cold surfaces when we are sitting in a room. The old potbellied stove that made you burning hot on one side and freezing cold on the other is a good example. When there is a heat layer between the occupants of the room and the cold wall surface, the wall can be cold without the people noticing it. The Maximlite design gets around the cold surfaces of the room with a warm layer of air.

COMMENT: Well, I am not going to comment on the U factor, but I would like to comment on the broader aspects of the steel building. I agree with both of these gentlemen. We have found that the cost of a school building divides roughly into three parts. The first part is the structural frame—the roof and the floor—which accounts for about a third of the cost. The second part, the mechanical cost, also makes up almost a third of the cost, as you have indicated. The third part of the cost of the building is the educational facilities.

When we talk about the steel buildings, I believe, we are talking about the frame only. I think it is a little bit misleading when we hear about the $6,500 rooms, because there is nothing in those rooms—no heating and probably no plumbing, and the water runs off the roof. I think it is a sad state of affairs if we are going to have to put our children in such buildings. Now I will grant you that there are some situations in which they are needed, but if any of you get any inspiration from looking at those steel buildings, you are more easily inspired than I am. If our lend-lease money can go to foreign lands to build fine school buildings and we have to build these little steel buildings for our own children, something is wrong. I tell you I can't quite figure it out. Mr. Maximlite, you said in the beginning that we wouldn't understand this because we are only architects and engineers. I'd like to direct a question to you. Are you selling a system? Are you competing with architects in designing a building? Do you have materials to sell, or just what is it that you are offering?

MR. FANNING: That's a very good question and I think it deserves a very direct and honest answer. We are designers and engineers. Many features in the Maximlite program have been patented and copyright features have been included, many of which are unique. I am very proud and happy to say that we have been licensed and privileged to design buildings along the Maximlite

line. We do a lot of other types of design work also, in Ohio, in Indiana, and in Michigan. We are looking for the same thing that every other architectural firm and engineering firm is looking for—we are looking for ways and means of devising better methods and better construction techniques. I spent more than 10 years all through the war doing nothing but consulting work on time and motion and methods of economy. The cost of the buildings that we erect are primarily the cost of materials and labor. The cost of materials is fixed somewhat by the cost of the labor that goes into them. For example, if brick costs $55 or $50 a thousand and brick laying costs so much, we are concerned, then, with the economy of motion involved in the design of a building using those materials.

The background of the idea lies with George W. Taylor who was its primary founder. Frank Gilbreath, of *Cheaper by the Dozen* fame, was the real conceiver of the art, which involves primarily the elimination of waste. We are trying to eliminate waste effort, waste space, and waste surfaces, and to simplify the methods by which we make connections and by which we frame a building so that there will actually be less motion in the erection of that building. Your automotive trades, in fact all of your mass production techniques, use the principle of motion economy that was so aptly evolved by Frank Gilbreath. The architects would do well throughout the country to learn more about this principle because it really has not yet touched the construction field. We have a lot to learn in that direction.

COMMENT: Speaking of motion, I was watching bricklayers on a scaffold the other day and I was looking for the motion. I wish you would come up with me and show me how they move. I think you are stopped when you get to the Union.

MR. MAURER: That's right, we are. I want to tell you something, because that opens up a subject that I think is very important. Most of us believe that experience is the best teacher, but those of you who are in the educational field will agree with me that there has to be some qualification to that. If experience were the best teacher it would have taught the bricklayer how to lay brick with the least motion. This is the oldest trade that I know of, six or seven thousand years old. Frank Gilbreath, when a hodcarrier in Boston, wondered why he could not cut down the effort that it took to lay brick. Although he almost lost his job, he finally persuaded his boss that he had an idea. Eventually he refined the installation technique in bricklaying step by step until,

instead of laying 300 to 500 brick a day, he was laying approximately 1,500 brick a day. You are going to ask me why we don't lay more than 500 brick a day today. That is about what the Union standard is. I'll agree with my colleague here that the reason is the Union, but that is not the only answer. We can use less brick to cover a given area by making a circumference out of it rather than an oblong.

MR. SHEALY: Mr. Maurer, I would like to comment briefly on your statement. I think that the shell portion of the building makes up about a third of the cost of the building but there are one or two other points that I would like to make. One is the speed with which you can get into one of these metal type buildings. The speed of construction is much faster, and the time element is part of the cost of labor. I would like to add that your foundations are influenced by the weight of your structure; therefore, you can have a lighter foundation. I would also like to point out the flexibility of the structure in 10 years—that is, if you should want to make a shop out of it, or add a building, your costs would be less. I didn't mean to go overboard in taking dollars to dress up these buildings. I'm talking about schools costing $65,000 a classroom, of which I have recently read—some in New England, some in California—while the children are going on double shifts and meeting in hallways in other parts of the state. That is the kind of situation that exists.

MR. BROWN: There's an old definition of an architect that I like very much. It goes something like this: An architect is an artist who composes buildings; he determines their proportions and their decorations and directs their execution. If that is true, buildings are just as different as people are.

It is the duty of an architect, of course, to determine the needs of the community through the board of education, the superintendent of schools, or whoever is in charge, and then to attempt to design that building economically. We don't believe in cheap buildings—we don't think that is the answer. We like to build good buildings economically, and we have been accused a good many times of building our buildings too well. But we can stand that accusation. In fact, we are rather proud of it. We often say this, that we feel that these buildings should last these communities 50 or 75 years and that they are going to have the same tenants during the whole period. The tenants are the same people who pay for the building, so we should think about maintenance costs.

Of course, the building has to be functional and should have

a pleasing environment. I believe that the building has an effect upon every child and every teacher who is in it. A building needs personality; it should leave everyone who leaves it or enters it with some pleasing thought in mind. That does not mean that it has to be gaudy. We don't believe in belfries and towers. But we believe that buildings can be built to have personality and yet be built economically. We think that every community has different needs—needs that should be analyzed.

I also would like to say that all architects need constructive criticism. I think every superintendent of schools, every school board, and every architect should speak his mind. In that way you can more nearly accomplish your purpose. We have built some buildings as low as $10 a square foot, but the majority of our buildings average from $13 to $15 a square foot. They are good buildings with masonry construction; face brick; a lightweight block backup; acoustical tile ceilings; ceramic tile in classrooms, corridors, and toilet rooms; and plaster over the lightweight block walls to make them moistureproof.

MR. BROWN: Are you going to use putty finished plaster, sand finished plaster, or a rough-textured plaster? You can do the same thing with plaster that you can with a block. Of course, you can use acoustical tile which will take care of the acoustical problem.

QUESTION: What do you do to stop expansion cracks in your concrete block wall?

MR. BROWN: Expansion cracks are most prevalent in the long corridors above the doors. The best thing that we know to use is Durawall, wire mesh-like fencing, which is put in the mortar joints of the blocks. Ninety per cent of those cracks are expansion cracks, not settlement cracks.

QUESTION: Why do they occur in concrete blocks more often than they do in brick walls?

MR. BROWN: In the block wall, there is a bigger unit and more absorption than there is in a brick wall.

COMMENT: That's right. Small cracks can actually set up when the wall is setting. Moisture goes out of your mortar so fast into that concrete block that small cracks which can not be seen with your naked eye can be set up. They get worse as time goes on. It is a good masonry practice to wet your masonry brick or block before putting it in the wall.

MR. BROWN: In this hot weather blocks or brick ought to be sprinkled two or three times a day at least. That will put moisture in them; consequently when they are laid, they won't take the

moisture out of the mortar so fast, and that will eliminate a lot of these hair cracks. Of course, it won't eliminate the bad cracks.

MR. SHEALY: I know of no building that we have constructed that has blown down except when they did not follow explicit instructions. Our type of building can be constructed wrong just as can any other type.

MR. BINFORD: We certainly appreciate the contributions that these gentlemen have made this afternoon. I am sure that they have made it interesting for all of us.

BULLETINS IN THE FIELD OF EDUCATION
INDIANA UNIVERSITY

The *Bulletin of the School of Education,* Indiana University, was first published in 1924 and has appeared regularly since that time. Research studies of interest to educators, proceedings of conferences held, and bibliographies of educational materials have been the principal fields touched upon in these bulletins. A complete list of the bulletins may be obtained from the School of Education upon request. The studies included in the present volume and in the two volumes immediately preceding it in date are listed below. Unless otherwise indicated, these may be obtained for $1 each from the Indiana University Bookstore, Bloomington, Indiana.

The Story of a Workshop. By Maurice E. Stapley, Vol. XXVIII, No. 1, 1952, 47 p.

Factors That High School Students Associate with Selection of Teaching as a Vocation. By Robert W. Richey, Beeman N. Phillips, and William H. Fox, Vol. XXVIII, No. 2, 1952, 46 p.

Extracurricular Activities in Indiana High Schools: The General Program, and Student Participation in School Government. By Christian W. Jung and William H. Fox, Vol. XXVIII, No. 3, 1952, 53 p.

Extracurricular Activities in Indiana High Schools: The Club Program. By Christian W. Jung and William H. Fox, Vol. XXVIII, No. 4, 1952, 53 p.

Indiana and Midwest School Building Planning Conference: Proceedings. Vol. XXVIII, No. 5, 1952, 112 p.

A Study of High School Guidance Services in a Six-State Area. By H. Robert Kinker and William H. Fox, Vol. XXVIII, No. 6, 1952, 108 p.

The Local School Facilities Survey. By Harold H. Church, Paul W. Seagers, W. Monfort Barr, William H. Fox, and Maurice E. Stapley, Vol. XXIX, Nos. 1 and 2, 1953, 96 p.

The Tenure of Indiana School Administrators. By Raleigh W. Holmstedt, Vol. XXIX, No. 3, 1953, 36 p.

A Guide to the Source Materials Relating to Education in the Laws of the State of Indiana, 1816-1851. Part One: 1816-1838. By Velorus Martz and Stanley E. Ballinger, Vol. XXIX, No. 4, 1953, 96 p.

An Experimental Analysis of Patterns of Differential Verbal Reinforcement in Classroom Situations. By Edmund V. Mech, Francis M. Hurst, J. Donavon Auble, and Nicholas A. Fattu, Vol. XXIX, No. 5, 1953, 25 p.

Indiana and Midwest School Building Planning Conference: Proceedings. Vol. XXIX, No. 6, 1953, 104 p.

Use of Evaluation Criteria in the Indiana Secondary Schools. By Carl G. F. Franzén, Christian Jung, and Otto Hughes, Vol. 30, No. 1, 1954, 83 p.

The Organization of the School of Education, Indiana University, for Policy Development. By A. Stafford Clayton, Vol. 30, No. 2, 1954, 43 p.

An Analysis of the Current Expenditures of Selected Indiana High Schools. By W. Monfort Barr, Vol. 30, No. 3, 1954, 30 p.

Promising Curriculum Practices in Secondary Schools in Indiana. By Indiana Association of Secondary School Principals—Editors: Carl G. F. Franzén, Arthur Hoppe, and Donald L. Simon, Vol. 30, No. 4, 1954, 98 p.

Indiana and Midwest School Building Planning Conference: Proceedings. Vol. 30, Nos. 5 and 6, 1954, 123 p. $2.